



**National Park Service - Southwest Alaska Network**  
**Inventory & Monitoring Program**

**Oceanic and Nearshore Research and Monitoring in the  
Northern Gulf of Alaska**

Terry S. Thompson  
Kachemak Bay Research Reserve  
Alaska Department of Fish & Game  
95 Sterling Highway Suite 2  
Homer, Alaska 99603

April 2004

File Number: NPS/AKRSWAN/NRTR-2004/01  
Contract Number: CA9088A0008

Funding Source:  
Inventory & Monitoring Program, National Park Service

**File name:** ThompsonT\_2004\_SWAN\_OceanNearshoreResrch\_568315.doc

**Recommended Citation:**

Thompson, Terry S. 2004. Oceanic and Nearshore Research and Monitoring in the Northern Gulf of Alaska, Southwest Alaska Network. National Park Service. Anchorage, AK. 110 pg.

**TOPIC(s):**

Research, Monitoring, Marine

**Theme Keywords:**

Research, monitoring, marine, oceanography, marine landscape, intertidal, nearshore, fisheries, benthos, marine mammals, plankton

**Place name Keywords:**

Alaska, Gulf of Alaska, Lake Clark National Park and Preserve, Kenai Fjords National Park, Katmai National Park and Preserve, Aniakchak National Monument and Preserve, Prince William Sound, Kenai Peninsula, Cook Inlet.

**Initial Distribution:**

One copy per participant in the survey.

One copy to the SWAN Coordinator.

One copy to each SWAN Technical Committee member.

**Acronyms:**

ACC	Alaska Coastal Current
ADCP	Acoustic Doppler Current Profiler
ALAG	Alagnak Wild River
ANIA	Aniakchak National Monument & Preserve
CPR	Continuous Plankton Recorder
CTD	Conductivity Temperature and Depth
HAB	Harmful Algal Bloom
I&M	Inventory & Monitoring (Program)
KATM	Katmai National Park & Preserve
KBRR	Kachemak Bay Research Reserve
KEFJ	Kenai Fjords National Park
LACL	Lake Clark National Park & Preserve
NPS	National Park Service
PWS	Prince William Sound
SWAN	Southwest Alaska Network
TDR	Time Depth Recorders

**Organization Acronyms:**

ARGO	A Global Array of Profiling Floats
ADNR	Alaska Department of Natural Resources
ABSC	Alaska Biological Science Center
ADFG	Alaska Department of Fish and Game
ADFG/KBRR	Alaska Department of Fish and Game, Kachemak Bay Research Reserve
ADFG/DWC	Alaska Fish and Game, Division of Wildlife Conservation
AFSC	Alaska Fisheries Science Center
ASC	Alaska Science Center
ASLC	Alaska Sea Life Center
ARSC/UA	Arctic Regional Supercomputing Center, University of Alaska
ABL	Auke Bay Laboratory
BPA	Bonneville Power Authority
CORI	Coastal and Ocean Resources, Inc.
CIAP	Coastal Impacts Assistance Program
CIRCAC	Cook Inlet Regional Citizens Advisory Council
EVOS Trustee	Exxon Valdez Oil Spill Trustee Council
FOC/IOS	Fisheries and Oceans Canada/Institute of Ocean Sciences
GLOBEC	Global Ocean Ecosystem Dynamics
GEM	Gulf Ecosystem Monitoring
IODP	Integrated Ocean Drilling Program
JOI/USSSP	Joint Oceanographic Institutions/US Science Support

	Program
KEFJ	Kenai Fjords National Park
NASA	National Aeronautics and Space Administration
NFWF	National Fish and Wildlife Foundation
NIEHS	National Institute of Environmental Health Sciences
NIST	National Institute of Standards and Technology
NMFS	National Marine Fisheries Service
NMML	National Marine Mammal Laboratory
NOAA	National Oceanic and Atmospheric Administration
NODC	National Oceanographic Data Center
NSF	National Science Foundation
NOAA/NOS/CO-	NOAA National Ocean Service/ Center for Operational
	Oceanographic Products and Services
NOAA/AFSC/ABL	NOAA, Alaska Fisheries Science Center, Auke Bay
	Laboratory
NOAA/AFSC/REFM	NOAA, Alaska Fisheries Science Center, Resource
	Ecology and Fisheries Management
NOAA/NMFS	NOAA, National Marine Fisheries Service
NOAA/PMEL	NOAA, Pacific Marine Environmental Laboratory
NOAA/SSLR	NOAA, Steller's Sea Lion Research
NGOS	North Gulf Oceanic Society
NPMRI	North Pacific Marine Research Institute
NPRB	North Pacific Research Board
NPUMMRC	North Pacific University Marine Mammal Research
	Consortium
PBS	Pacific Biological Station
PM	Pratt Museum
PWSSC	Prince William Sound Science Center
RU	Rutgers University
SFU	Simon Fraser University
SAHFOS	Sir Alister Hardy Foundation For Ocean Science
SI	Smithsonian Institute
UAF/SFOS/IMS	University of Alaska Fairbanks, School of Fisheries and
	Ocean Science, Institute of Marine Science
UAM	University of Alaska Museum
UA	University of Arkansas
UFL	University of Florida
UME	University of Maine
FWS	US Fish and Wildlife Service
USGS	US Geological Survey
USGS/ASC	US Geological Survey, Alaska Science Center
NPS	US National Park Service
VPA	Vancouver Public Aquarium

## Table of Contents

Abstract	1
Executive Summary	2
Introduction	4
Methods	4
Results	5
Conclusions	11
Acknowledgements	11
Appendices	
Appendix A: Letter	13
Appendix B: Questionnaire	15
Appendix C: Project Summaries	17



## **ABSTRACT**

The National Park Service, Southwest Alaska Network (SWAN) is currently in the early design phase of developing a long-term vital signs monitoring program for four national Park Units containing 1,100 miles of coastline in the Northern Gulf of Alaska (NGOA). Knowledge of on-going physical and biological marine research and monitoring occurring in the area encompassing the SWAN is lacking. To prevent needless duplication of effort, enhance efficiency, and pave the way for collaborative monitoring and research, it is crucial to determine the state of knowledge and identify all on-going and planned future data collection efforts that are relevant to the SWAN planning process.

To meet this need, the National Park Service and the Kachemak Bay Research Reserve recently conducted a questionnaire survey of approximately 100 known principal investigators working in the NGOA. From these completed surveys a compilation database and document of marine research and monitoring project summaries has been completed for on-going and planned biological and physical oceanographic research occurring in 2003 within the National Park Service Southwest Alaska Network. The intent of this project is three-fold: 1) to provide scientists working within the NGOA a reference document of known on-going and planned research 2) to help in the identification of research gaps in the NGOA and 3) to provide the first document, of potentially a long-term project that produces an annual reference for on-going and planned research in the NGOA.

## EXECUTIVE SUMMARY

The National Park Service – Southwest Alaska Network is in the process of designing a long-term monitoring effort for the four parks that fall within the unit – Lake Clark N.P., Katmai N.P., Aniakchak N.P., and Kenai Fjords N.P. To design an effective monitoring program, a thorough knowledge of on-going and planned physical and biological marine research occurring in the northern Gulf of Alaska is desired. To meet this goal, the Kachemak Bay Research Reserve was contracted to survey marine researchers working in the northern Gulf of Alaska and compile these findings into a database and report.

Using personal interviews and Internet searches approximately 100 potential investigators were identified to receive the survey via email. In addition, broadcast emails were sent to existing research listserves, regional University marine science faculty as well as currently funded researchers from the Exxon-Valdez Oil Spill Trustee Council's, Gulf of Alaska Ecosystem Monitoring and Research program. The response rate for this survey cannot be determined due to the unknown number of recipients receiving the email announcement, but the response rate is estimated to be extremely low. The survey asked only if the researcher was *currently* involved in a project in the northern Gulf of Alaska. It was beyond the scope of this survey to determine past research activity or future research emphasis in the region. Also, by using various listserves, the survey team had no ability to pre-select recipients who are known to have worked, or are currently working in the Gulf of Alaska.

Fifty-four completed surveys were submitted for inclusion into the compilation document and database. These surveys were categorized into four marine research focus areas: biological, physical, cultural and other. Further delineation into subtopics was then undertaken using the following focus areas; benthic, intertidal, oceanic, plankton, birds, fish, marine mammals.

Results showed 57% of the submitted projects (31) were involved in biological research, with 74% of the biological projects focusing on fish, birds and marine mammals. Projects focusing on the physical marine environment made up 30% of the submitted projects (16), with 56% of the physical projects looking at the oceanic environment.

The majority of the researchers (57%) were shown to be employees of the federal government, with 24% employed by academic institutions.

Results showed that funding for the submitted projects was overwhelmingly provided by one or more entities within the federal government, with 91% of the projects having some level of federal support. The State of Alaska was also actively involved in financial support of numerous projects, with 50% of the submitted projects showing some level of state support.

As expected, a large percentage of the submitted projects focused on the Gulf of Alaska with 43% of the submitted projects occurring in the Gulf. The Cook Inlet/Kachemak Bay region was also strongly represented with 26% of the submitted projects focusing on the region.

It is extremely difficult to draw conclusive results from this survey. This survey is an excellent first step and can be used to justify continuing this process in future years. This survey did show the groups or entities that are conducting research in the Gulf of Alaska, and where



future surveys might concentrate their energies in future years. It also showed the diversity of funding sources that are committing funds to the region. And most importantly, it shows who is currently working in the region, allowing for potential future collaborations.

The compilation document, and associated detailed project information for each submitted project can be viewed at the National Park Service - Southwest Area Network website at <http://www.nature.nps.gov/im/units/swan/index.cfm> or the Kachemak Bay Research Reserve website at [www.kbayrr.org](http://www.kbayrr.org).

## **INTRODUCTION**

The National Park Service (NPS) Southwest Alaska Network (SWAN) is in the early design phase of developing a long-term vital signs monitoring program for four national Park Units containing 1,100 miles of coastline in the Northern Gulf of Alaska. At the present time, a thorough knowledge of on-going physical and biological marine research and monitoring occurring in the area encompassing the SWAN is lacking. To prevent needless duplication of effort, enhance efficiency, and pave the way for collaborative monitoring and research, it is crucial to determine the state of knowledge and identify all on-going and planned future data collection efforts that are relevant to the SWAN planning process.

Alaska Department Fish and Game through the Kachemak Bay Research Reserve (KBRR) agreed to cooperatively produce with the National Park Service, a compilation database and document of marine research and monitoring project summaries for on-going and planned biological and physical environment research within the NPS SWAN area (Lake Clark National Park and Preserve, Katmai National Park and Preserve, Kenai Fjords National Park, Aniakchak National Monument and Preserve, excluding Bristol Bay).

Alan Bennett, Monitoring Coordinator for the Southwest Area Network, National Park Service and Dr. Carl Schoch, then Science Director for the Kachemak Bay Research Reserve formulated the design for the compilation document, modeled after a similar document produced by the Partnership for Interdisciplinary Studies of Coastal Oceans (PISCO).

## **METHODS**

As work began on the compilation project it became clear that there was not a comprehensive list of past or on-going research projects, or a list of primary investigators working in the northern Gulf of Alaska or SWAN regions. Initial work on the project therefore required numerous personal interviews with various regional researchers as well as Park Service staff, in conjunction with an Internet search of past and on-going research occurring in the northern Gulf of Alaska. Using these techniques, a list of approximately 100 potential principal investigators were identified and contacted via email beginning May 13, 2003. In addition to these individuals, the faculty of the University of Alaska – Fairbanks, School of Fisheries and Ocean Sciences; Oregon State University, College of Oceanic and Atmospheric Sciences; and the University of Washington, College of Ocean and Fishery Sciences were contacted with assistance from their respective school Deans. The ARCUS (Arctic Research Consortium of the US) listserv was also used as a means of contact, as well as staff from the Exxon-Valdez Oil Spill Trustee Council assisted in the distribution of the survey by sending emails to all currently funded principal investigators. It is expected that many researchers received numerous emails requesting participation depending on their involvement with the listserves as well as their university and funding affiliations.

The email sent to each individual included a cover letter (Appendix A) introducing the project and the expected outcomes of the compilation document, as well as the 12-question survey (Appendix B). It was the intent of this project to minimize the time required of the principal investigators to complete the survey. Therefore, survey questions were designed to allow the respondents to cut and paste information from existing sources, thus limiting the amount of original writing needed to complete the survey. A limited subset of respondents was asked in

opportunistic follow-up phone conversations about the length of time necessary to complete the survey, and it was found to take approximately 10 minutes to complete. Respondents were initially given approximately 6 weeks to complete the requested survey however surveys were received and included in the final document that arrived up to 2 months following the established deadline.

Following receipt of the completed surveys, each of the submitted projects was reviewed and edited for uniformity and file naming nomenclature. An Excel database was developed by the National Park Service Southwest Area Network Data Manager to manage the received questionnaires. KBRR staff was used to input questionnaire data into the database.

## RESULTS

Fifty-four completed surveys were received for inclusion into the compilation document (Appendix C). The final response rate for this survey is unknown, but it is estimated to be extremely low. The exact number of individual recipients who received the emailed invitation to participate cannot be determined due to the use of listserves and broadcast emails within academic institutions and granting agencies. Also, by using various listserves, the survey team had no ability to pre-select recipients who are known to be currently working in the Gulf of Alaska. It is possible, and highly probable that many principal investigators were contacted multiple times through the various email lists. Also, the survey asked only if the researcher was *currently* involved in a Gulf of Alaska project. It was beyond the scope of this survey to determine the past research activity or future research emphasis of a particular researcher in the region.

The 54 surveys were categorized into four major topic areas: biological, physical, cultural and other. These major categories were then grouped into subtopics that included the following breakdown:

### Biological:

Subtopic	Projects Submitted
Benthic	3
Birds	7
Fish	9
Intertidal	1
Marine mammals	7
Oceanic	3
Plankton	1

### Physical:

Subtopic	Projects Submitted
Benthic	1
Fish	2
Intertidal	3
Oceanic	9
Plankton	1

**Cultural:**

Subtopic	Projects Submitted
Fish	2
Other	1

**Other:**

Subtopic	Projects Submitted
Oceanic	1
Plankton	1
Other	1

Within these 54 submitted projects, 68 scientists were listed as principal investigators, these included 36 employees of the U.S. Federal Government, 8 are State of Alaska employees, 16 are employed by academic institutions (U.S. and Canada), four work for non-profits and four are employed by Fisheries and Ocean Canada. Nine of the responding principal investigators provided responses for multiple projects. The following is a breakdown of individual employees and their associated agency/institution:

**Federal Agencies:**

Agency	Number of Investigators
National Institute of Environmental Health	2
National Institute of Standards and Technology	1
National Oceanic and Atmospheric Administration	6
Alaska Fisheries Science Center	2
National Marine Mammal Laboratory	5
National Marine Fisheries Service	8

Pacific Marine Environmental Laboratory	5
Smithsonian	1
U.S. Fish and Wildlife Service	3
U.S. Geological Survey	3

**State Agencies:**

Agency	Number of Investigators
Alaska Department of Fish and Game	8

**International Agencies:**

Agency	Number of Investigators
Fisheries and Ocean Canada	4

**Academic Institutions:**

Institution	Number of Investigators
Simon Fraser University	1
University of Alaska – Fairbanks	10
University of Alaska Museum	1
University of Arkansas	1
University of British Columbia	1
University of Florida	1
University of Maine	1

**Non-Profit:**

Organization	Number of
--------------	-----------

	Investigators
North Gulf Oceanic Society	1
Sir Alister Hardy Foundation Ocean Science	1
Prince William Sound Science Center	1

**For-Profit:**

Organization	Number of Investigators
Coastal and Ocean Resources	1

A wide range of agencies, institutions and private funding sources were identified within the 54 projects. Project support ranged from single entities to multi-agency/institution involvement. Analysis of the respondents showed that 12 federal agencies were identified as providing some level of support to 49 projects. Seven academic institutions and/or consortiums financially supported 10 projects, and the State of Alaska supported 19 projects. Five non-profits or foundations supported 9 projects.

**Federal:**

Agency	Projects Funded
Bonneville Power Administration	2
GLOBEC	3
Integrated Ocean Drilling Program	1
National Aeronautics and Space Administration	3
National Institute of Environmental Health Sciences	1
National Institute of Standards and Technology	1
National Oceanic and Atmospheric Administration	9
Alaska Fisheries Science Center	1

National Ocean Service, Center for Operational Oceanographic Products and Services	1
National Marine Fisheries Service	8
National Marine Mammal Laboratory	1
National Science Foundation	3
North Pacific Research Board	3
U.S. Fish and Wildlife Service	5
U.S. Geological Survey	5
U.S. National Park Service	2

**State of Alaska:**

Agency	Projects Funded
Alaska Department of Fish and Game	13
Exxon-Valdez Oil Spill Trustee Council – Gulf Ecosystem Monitoring	6

**Academic:**

Institution	Projects Funded
Arctic Regional Supercomputing Center	1
Joint Oceanographic Institutions/U.S. Science Support Program (18 member institutions)	1
University of Alaska	1
North Pacific University Marine Mammal Research Consortium - Oregon State University University of Alaska University of British Columbia University of Washington	1
Simon Fraser University	1

University of Alaska Museum	1
University of Alaska – Fairbanks	4
University of Arkansas	1

**Non-Profit:**

Institution	Projects Funded
Alaska SeaLife Center	4
Cook Inlet Regional Citizens Advisory Council	1
National Fish and Wildlife Foundation	2
North Gulf Oceanic Society	1
Prince William Sound Science Center	1

Review of the 54 projects showed a diverse area of study, but a majority of projects were conducted in two areas, the Gulf of Alaska and the Cook Inlet/Kachemak Bay region.

Region	Number of Projects
Aleutian Islands	3
Cook Inlet/Kachemak Bay	14
Gulf of Alaska	23
Kodiak/Alaska Peninsula	3
Prince William Sound	5
Statewide	6

The compilation document, and associated detailed project information for each submitted project can be viewed at the National Park Service - Southwest Area Network website at <http://www.nature.nps.gov/im/units/swan/index.cfm> or the Kachemak Bay Research Reserve website at [www.kbayrr.org](http://www.kbayrr.org).



## CONCLUSIONS

Following completion of the project a number of limitations or “lessons learned” became apparent. These identified limitations can be used to make future survey compilation projects more efficient. These limitations were:

- ***Time of year of the survey:*** This survey was undertaken during the early field season of 2003. Future compilation projects should be initiated during the late fall/winter months, with completion of the project to occur in late winter/early spring.
- ***Better description of how contributing to the project will help other PI's:*** Comments received both directly and indirectly revealed that many survey recipients did not give the project serious consideration.
- ***Potential of using a web-based survey:*** A higher response rate might have been achieved if the respondents were provided with an easier mode of completing the survey. KBRR staff has been associated with other surveys that used a web-based format – those surveys achieved response rates in excess of 70%.
- ***Better follow-up with potential respondents to ensure a higher level of participation.***
- ***Change the format of the questionnaire:*** Future surveys should consider a more user-friendly format to both the respondents and data entry staff.
- ***Have required fields in the survey:*** Too many of the surveys were returned with incomplete information. This suggestion can be achieved by using a web-based survey, where the respondent cannot proceed without answering specific questions.
- ***Garner support from leaders of research entities (e.g. universities, government agencies, research organizations) to ensure participation by their staff:*** University Deans gave support to the project, but actual participation by university staff appeared to be limited.

## ACKNOWLEDGEMENTS

This project is due to the efforts of several dedicated individuals.

Thank you to Alan Bennett and Dorothy Mortensen from the National Park Service – Southwest Alaska Network. Alan had the vision for the project and the means to make it happen. Dorothy did an incredible job with creation of the database and making all the necessary changes to make it functional.

Thank you to Carl Schoch who, when this project began was the Science Director for the Kachemak Bay Research Reserve – Carl built on Alan's vision and helped in the formulation of a plan to make the project a reality.

Thanks again to each of you!



# Oceanic and Nearshore Research and Monitoring in the Northern Gulf of Alaska

## Appendix A: Letter

Dear Colleague,

We are compiling a list of marine research projects for 2003 in the Northern Gulf of Alaska (e.g. Icy Straits to Cold Bay). Such a compilation would help individual investigators identify complimentary datasets or fruitful opportunities for collaboration. Furthermore, as the concept of a broad area ocean observing system advances in the political and scientific arenas, a means of tracking data gathering efforts can help isolate data gaps in space and time as well as identify new data needs. It has been our experience that investigators gathering data in the Gulf of Alaska often represent many different institutions with broad geographic distributions. This makes it challenging to integrate multi-disciplinary datasets and coordinate activities. Your help in providing a *brief* description of your project in the area will ensure the success of this effort.

Alaska now has several long-term marine science programs unrivaled in North America including the North Pacific Research Board (NPRB: <http://www.nprb.org/>), and the Gulf of Alaska Ecosystem Monitoring and Research program (GEM: <http://www.oilspill.state.ak.us>). In addition, the National Park Service (NPS) is developing a long-term monitoring program for four coastal Parks: Lake Clark, Katmai, Aniakchak, and Kenai Fjords (SWAN: <http://www1.nature.nps.gov/im/units/nw01/>). These park units represent about 1,100 miles of coastline in the Northern Gulf of Alaska. We currently lack a thorough inventory of marine research and monitoring occurring in the region. To prevent needless duplication of effort, enhance collaboration, and pave the way for coordinated monitoring and research, it is crucial to identify all data collection efforts that are currently in progress or scheduled for 2003.

The Kachemak Bay Research Reserve (KBRR) is assisting NPS with this survey by compiling the submitted information and making the results available via email to respondents as soon as possible, and generally via the KBRR web page ([www.kbayrr.org](http://www.kbayrr.org)) at a later date. Planned annual updates to this compilation will help researchers stay abreast of data collected in the Northern Gulf of Alaska.

You have been identified as a potential Principle Investigator with an on-going marine research project or projects in the Northern Gulf of Alaska. Please provide the information requested (attached) for each project and return by email the questionnaire and map to us at your earliest convenience. Please feel free to pass this request on to others who may have been omitted from our distribution list. We would like to thank you in advance for your cooperation. Please return to completed questionnaire to Terry Thompson at [terry\\_thompson@fishgame.state.ak.us](mailto:terry_thompson@fishgame.state.ak.us) <[mailto:terry\\_thompson@fishgame.state.ak.us](mailto:terry_thompson@fishgame.state.ak.us)>. If

you have questions concerning this project or the information requested, you may also contact Terry Thompson at (907) 235-4799 x 7.

In an effort to ensure wide spread coverage of our project we are using several email lists, which may cause you to receive multiple email notices requesting your participation. We ask for your patience if you have already received this email.

Sincerely,

G. Carl Schoch  
Science Director  
Kachemak Bay Research Reserve  
email: [carl\\_schoch@fishgame.state.ak.us](mailto:carl_schoch@fishgame.state.ak.us)

Alan Bennett  
Inventory and Monitoring Coordinator  
Southwest Alaska Network  
National Park Service  
email: [alan\\_bennett@nps.gov](mailto:alan_bennett@nps.gov)

# **Oceanic and Nearshore Research and Monitoring in the Northern Gulf of Alaska**

## **Appendix B: Questionnaire**

Project title:

Principle investigator(s) and contact information:

Primary contact:

Project affiliation:

Web site address:

Hypotheses or objective (e.g. proposal abstract):

Data being collected in 2003:

Type and location (latitude/longitude) of deployments, experiments, transects, etc:

Expected duration of project:

How and when will the data be made available?

List of published and unpublished reports:

Research area – Please include map:

If a map of your research area is unavailable, please use one of the following links to generate a map of the research area:

Small spatial scale projects: <http://www.topozone.com/default.asp>

Large spatial scale projects: <http://rimmer.ngdc.noaa.gov/coast/getcoast.html>



# **Oceanic and Nearshore Research and Monitoring in the Northern Gulf of Alaska**

## **Appendix C: Project Summaries**







**National Park Service - Southwest Alaska Network**  
Inventory & Monitoring Program

**Oceanic and Nearshore Research and Monitoring in the  
Northern Gulf of Alaska**

**Project Summaries**

April 2004



## Table of Contents

<b>Biological, Benthic</b>	<b>1</b>
Assessment of the distribution, composition, and trophic role of microphytobenthos occupying tidal flats in Kachemak Bay	1
Freezing tolerance and survival of intertidal invertebrates in Kachemak Bay, AK	4
Reconnaissance of horse clams ( <i>Tresus capax</i> ) near Kodiak Island, Alaska	5
<b>Biological, Birds</b>	<b>6</b>
Barren Islands Seabird Studies	6
Harlequin Duck population recovery following the Exxon Valdez Oil Spill	8
Population delineation of Prince William Sound harlequin ducks	10
Seabird Research and Monitoring on Middleton Island	11
Seasonal Movements and Distribution of wintering Steller's Eiders ( <i>Polysticta stelleri</i> )	12
Semidi Islands Seabird Research and Monitoring	13
Small boat and aerial survey of waterfowl in Kachemak Bay, Alaska	14
<b>Biological, Fish</b>	<b>15</b>
Canada-USA Shelf Salmon Survival Study	15
GLOBEC 2000: Factors affecting the distribution of juvenile salmon in the Gulf of Alaska	16
Gulf of Alaska Biennial Bottom Trawl Survey of Groundfish Resources	18
Kamishak Bay herring stock assessment	20
Lower Cook Inlet salmon catch and escapement monitoring	22
Resource Ecology and Ecosystem Modeling Program	24
Southeast Alaska Coastal Monitoring (SECM)	26
Surface Nutrients Over the Shelf and Basin in Summer – Bottom up Control of Ecosystem Diversity	29
Utilization of Alaska kelp beds by commercially important fishes	31
<b>Biological, Intertidal</b>	<b>32</b>
Factors affecting herbivores and predators along a vertical gradient in Kachemak Bay	32
<b>Biological, Marine Mammals</b>	<b>33</b>
Abundance and distribution of harbor seals ( <i>Phoca vitulina</i> ) in the Gulf of Alaska (including the south side of the Alaska Peninsula, Kodiak Island, Cook Inlet and Prince William Sound) during 2001	33
Alaska Marine Mammal Tissue Archival Project (AMMTAP)	34
Gulf of Alaska cetacean survey	39
Investigations of harbor seals in Alaska	41
Sea Otters and Coastal Ecosystems	42
Steller sea lion pup counts and branding	46
Steller Sea Lions and Predation by Killer Whales in Kenai Fjords/Prince William Sound; Killer Whale Monitoring in Kenai Fjords/Prince William Sound, Killer Whales and Steller sea lions; Predator/Prey Relationships	48
<b>Biological, Oceanic</b>	<b>49</b>
AnaGisa - Census of Marine Life	49
Database on the Marine Invertebrate Macrofauna of Prince William Sound: An Addition to the University of Alaska Museum's ARCTOS Network	50
Westward Region Small-Mesh Trawl Survey	51
<b>Biological, Plankton</b>	<b>53</b>
A Continuous Plankton Recorder based survey to monitor the Gulf of Alaska and detects ecosystem change	53
<b>Cultural</b>	<b>54</b>
Kenai Fjords Oral History and Archaeology Project	54
Prehistoric and Historic Subsistence-Settlement Patterns on the Central Alaska Peninsula	55

<b>Cultural, Fish</b>	<b>56</b>	
Risks and Benefits of Rural Diet		56
<b>Other</b>	<b>57</b>	
National Estuarine Research Reserve System-Wide Monitoring Program		57
<b>Other, Oceanic</b>	<b>59</b>	
Visible remote sensing of the Gulf of Alaska		59
<b>Other, Plankton</b>	<b>61</b>	
GLOBEC Northeast Pacific: Satellite-observed ocean variability		61
<b>Physical, Benthic</b>	<b>62</b>	
Evaluating Decadal-Scale Climate Change and Geomagnetic Paleointensity Records in Continental Shelf Strata on the Subarctic Pacific: Site Augmentation for IODP Proposal 597		62
<b>Physical, Intertidal</b>	<b>71</b>	
High resolution mapping of intertidal and shallow subtidal shores in Kachemak Bay, Alaska		71
Modeling intertidal habitats: Producing a biological inventory for coastal management, resource assessment, and monitoring		73
Shore-zone mapping in the Gulf of Alaska		75
<b>Physical, Oceanic</b>	<b>76</b>	
A High Frequency Radar System for Real-time Surface Current Mapping in the Northern Gulf of Alaska		76
ARGO (A Global Array of Profiling Floats) and Line P surveys 2. Line P Time-Series Program		78
Cook Inlet Current Survey		79
Near Real-Time Biophysical Moorings for the Monitoring of Chiswell Ridge		80
NOAA/Pacific Marine Environmental Laboratory Ocean Climate Research Profiling Floats		81
NOAA/Pacific Marine Environmental Laboratory Ocean Climate Research Profiling Floats		83
Nowcast/Forecast System for Prince William Sound: Observational Oceanography		84
Physical forcing of marine productivity: monitoring moorings on the Gulf of Alaska shelf		85
Real-Time AVHRR Imagery		87
Simulation of the Circulation, Mixing and Lower Trophic Levels in the Gulf of Alaska		88
<b>Physical, Plankton</b>	<b>90</b>	
GLOBEC-NEP: Topographic Control of Mesoscale Variability in the Gulf of Alaska		90

## Biological, Benthic

### Assessment of the distribution, composition, and trophic role of microphytobenthos occupying tidal flats in Kachemak Bay

**Related Park:** Southwest Alaska Network  
**Project Affiliations:** National Oceanic and Atmospheric Administration  
**Website Address:** none given

**Primary Contact:**

Carolyn Currin  
National Oceanic and Atmospheric Administration  
101 Pivers Island Road  
Beaufort, NC 28516 United States  
Voice: (252)728-8749 fax: none given  
carolyn.currin@noaa.gov

**Principal Investigators:**

**Hypotheses:**

The main objectives of this project are to answer the following:

1. Does the spatial distribution of microalgae in Kachemak Bay indicate certain "hot spots" of food availability for suspension and deposit feeders, as a result of circulation patterns?
2. Are littleneck clams utilizing benthic microalgae as an important food source?
3. Are microalgae occupying tidal flat habitats providing significant primary production to support shellfish and filter feeders occupying either tidal flats or other habitats in Kachemak Bay?
4. Are harmful algal bloom (HAB) species a component of the microalgal community in Kachemak Bay?
5. Does starvation invoke a measurable change in biomarker stress proteins and stable isotope signature of littleneck clams?

**Data Being Collected:**

Data being collected in 2003: None, due to lack of funding

<b><u>Progress:</u></b>	In work	<b><u>West:</u></b>	-152
<b><u>First Year Collected:</u></b>	2002	<b><u>East:</u></b>	-150.8
<b><u>Duration of Project:</u></b>	2003	<b><u>North:</u></b>	60
<b><u>Duration Descript:</u></b>	Field collections were completed in September 2002 Laboratory analysis will be completed in September 2003	<b><u>South:</u></b>	59.25

**Publications:**

Unpublished Progress Report September 2002

**Comments:**

Map showing water column stations was not included because database would not accept 2 maps. Data collected includes sediment particle-size and organic matter content, chlorophyll content of upper 3 cm, microphytobenthos taxonomic composition, stable C and N isotope composition of microphytobenthos, macroalgae, eelgrass, bivalves and other benthic macrofauna.

**Map Description:** Tidal flat stations sampled in July and September 2002 by NOAA Beaufort Laboratory.

**Maps:**

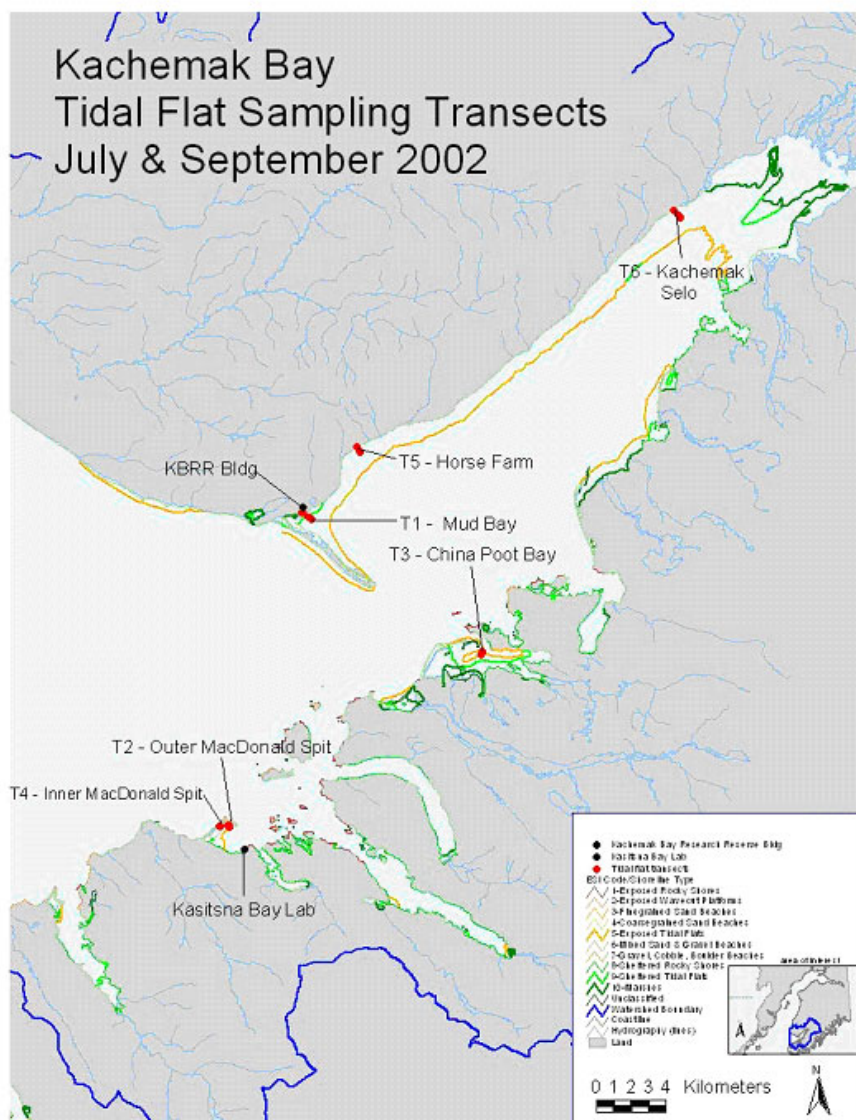


Figure 1. Tidal flat stations sampled in July and September 2002 by NOAA Beaufort Laboratory. Data collected includes sediment particle-size and organic matter content, chlorophyll content of upper 3 cm, microphytobenthos taxonomic composition, stable C and N isotope composition of microphytobenthos, macroalgae, eelgrass, bivalves and other benthic macrofauna.

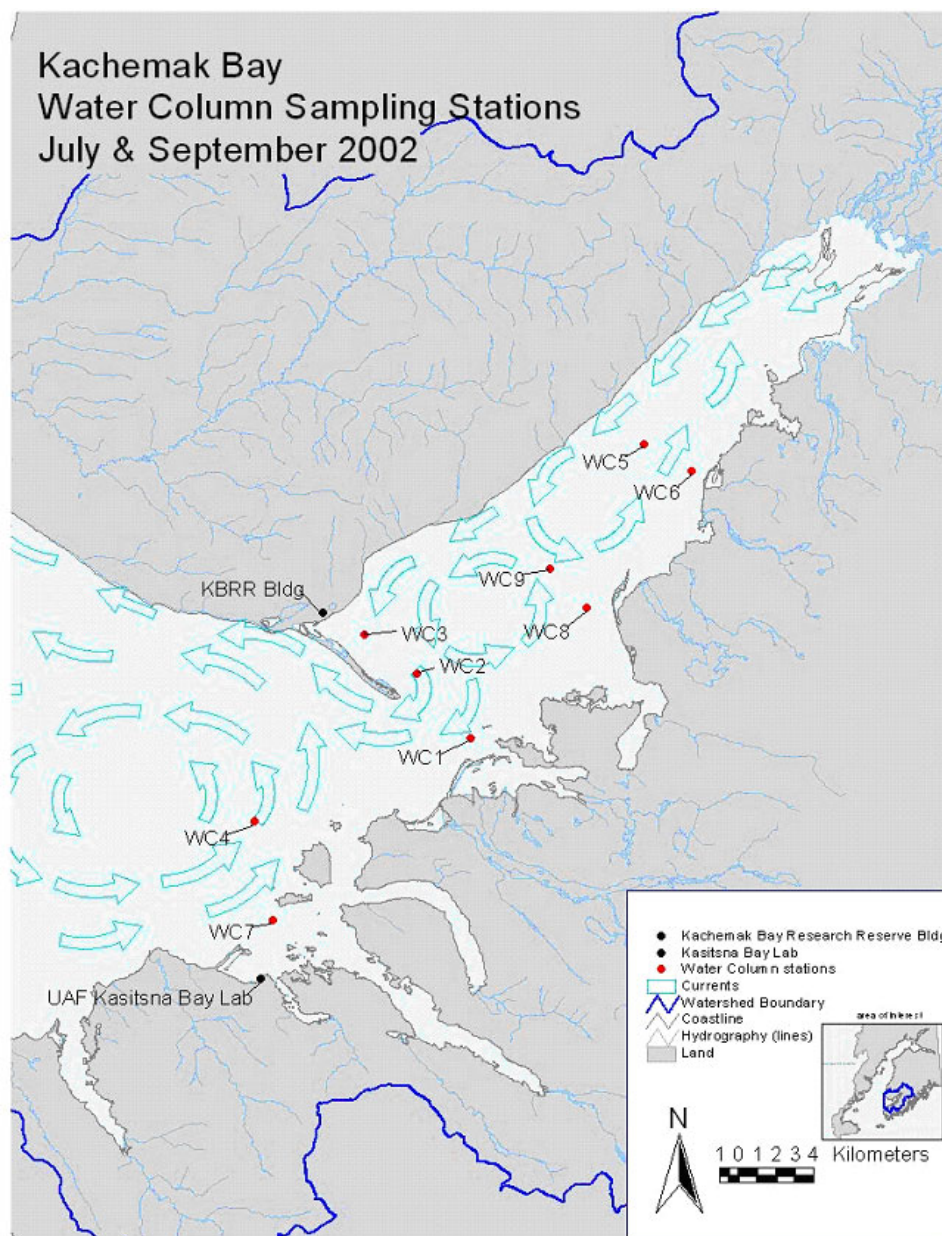


Figure 2. Water column stations sampled in July and September 2002 by NOAA Beaufort Laboratory. Data collected include temperature, salinity, chlorophyll, phytoplankton taxonomic composition and stable C and N isotopic composition of particulate matter.

**Freezing tolerance and survival of intertidal invertebrates in Kachemak Bay, AK**

**Related Park:** Southwest Alaska Network

**Project Affiliations:** University of Alaska Fairbanks, School of Fisheries and Ocean Science, Institute of Marine Science

**Website Address:** none given

**Primary Contact:**

Heather Patterson, graduate student  
University of Alaska Fairbanks, School of Fisheries and Ocean  
Science, Institute of Marine Science

No address

Voice: (907)474-7074 fax: none given  
fthkp@uaf.edu

**Principal Investigators:**

**Hypotheses:**

1. Survival of Mytilus, Balanus, Protothaca at various temps (0, -10, -20) - Limpets, Katharina, Fusitriton, Leptasterias too but with less data - also includes survival at different times of the year (~2 years)
2. Supercooling pts of Mytilus and Protothaca

**Data Being Collected:**

Data being collected in 2003: Data collection finished May 03

**Progress:** In work

**First Year Collected:**

**Duration of Project:**

**Duration Descript:** Data collection finished May 03

**West:** -152

**East:** -150.75

**North:** 59.9

**South:** 59.3



**Reconnaissance of horse clams (*Tresus capax*) near Kodiak Island, Alaska**

**Related Park:** Katmai National Park and Preserve  
**Project Affiliations:** University of Alaska Fairbanks, School of Fisheries and Ocean Science, Institute of Marine Science;  
Alaska Department of Fish and Game  
**Website Address:** <http://www.sfos.uaf.edu/directory/faculty/jewett/>

**Primary Contact:**

**Principal Investigators:**

Stephen Jewett, Research Professor  
University of Alaska Fairbanks, School of Fisheries and Ocean  
Science, Institute of Marine Science  
Fairbanks, AK 99775 United States  
Voice: (907)474-7841 fax: (907)474-7204  
[jewett@ims.uaf.edu](mailto:jewett@ims.uaf.edu)

**Hypotheses:**

This project focuses on the horse (gaper) clam resource along the northeast side of Kodiak Island. Using a chartered vessel, a remote video system, and diving biologists, commercial quantities of clams will be assessed through a reconnaissance survey. Divers from University of Alaska Fairbanks will gather size, abundance and biomass information with oversight provided by ADF&G biologists. The findings will be used to form the basis for an application to develop a fishery under the department's Developing Fisheries Plan.

**Data Being Collected:**

Data being collected in 2003: Density, biomass, size, age structure, and habitat of horse clams

**Progress:** In work

**First Year Collected:** 2003

**Duration of Project:**

**Duration Descript:** 1 year

**West:** -155

**East:** -151.5

**North:** 59

**South:** 56.1

### Barren Islands Seabird Studies

**Related Park:** Southwest Alaska Network  
**Project Affiliations:** US Fish and Wildlife Service  
**Website Address:** <http://www.r7.fws.gov/nwr/akmnwr/akmnwr.html>

**Primary Contact:**

Arthur Kettle  
US Fish and Wildlife Service  
2355 Kachemak Drive, Ste.101  
Homer, AK 99603 United States  
Voice: (907)235-6546 fax: none given  
Arthur\_Kettle@fws.gov

**Principal Investigators:**

**Hypotheses:**

Monitor seabird population size, nesting dates, reproductive success, chick growth, and chick diet at the Barren Islands, Alaska.

**Data Being Collected:**

Data being collected in 2003: Monitoring of population size, nesting dates, reproductive success, chick growth, and chick diet of seabirds at East Amatuli Island. Also sea surface temperature.

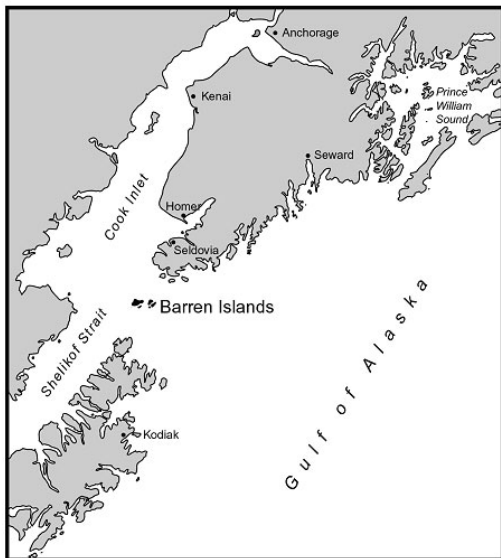
**Progress:** In work  
**First Year Collected:** 2003  
**Duration of Project:** 2003  
**Duration Descript:** 7 weeks

**West:** -152.5  
**East:** -151.5  
**North:** 59.25  
**South:** 58.75

**Publications:**

Roseneau, D.G., A.B. Kettle, and G.V. Byrd. 2000. Common murre population monitoring at the Barren Islands, Alaska 1999. Exxon Valdez Oil Spill Restoration Project Final Report (Restoration Project 99144), U.S. Fish and Wildlife Service, Alaska Maritime National Wildlife Refuge, Homer, Alaska.

**Map:**



## Harlequin Duck population recovery following the Exxon Valdez Oil Spill

**Related Park:** Alaska Region  
**Project Affiliations:** US Geological Survey; Simon Fraser University; Alaska Science Center  
**Website Address:** none given

**Primary Contact:**

Dan Esler  
 Simon Fraser University  
 5421 Robertson Road  
 Delta, BC V4K 3N2 Canada  
 Voice: (604)940-4652 fax: none given  
 desler@sfu.ca

**Principal Investigators:**

**Hypotheses:**

Harlequin ducks have not fully recovered from the EVOS, based on population-level demographic differences between oiled and unoled areas. Further, in oiled areas, harlequin ducks show elevated cytochrome P4501A (CYP1A) through 1998, almost certainly reflecting continued exposure to oil. We propose to explore links between oil exposure and the lack of population recovery, with the intent of understanding constraints to full recovery of harlequin ducks and the nearshore environment generally. We also will monitor the progress of recovery of the species and the system. Proposed work consists of both field and experimental lab component. Field studies will examine the relationships between survival and CYP1A and, further, will serve to monitor these key parameters. Captive experiment on harlequin ducks will examine the relationships between oil exposure and CYP1A induction, and the metabolic and behavioral consequences of exposure to oil.

**Data Being Collected:**

Data being collected in 2003: 2003 is the last year of data collection; we have just received the final survival monitoring and P450 data from field studies. Types of data included capture data for ducks (sex, age, mass, morphometrics, etc), telemetry data for females and cytochrome P549 data for females. Captive experiments were conducted at the Alaska SeaLife Center in Seward, using female harlequin ducks captured in Prince William Sound (Montague Island) during fall wing molt in 2000 and 2001. Data sets from experiments include behavior monitoring, metabolism (BMR and DEE), and p540 response to oil ingestion treatments. Behavior and metabolism data also were collected for externally oiled birds.

**Progress:** In work

**First Year Collected:**

**Duration of Project:** 2003

**Duration Descript:** Data collection in complete. Reports and papers from the early years of the study (95-98) are described below. Reports and publications from the latest round of work (2000-03) are in preparation.

**West:** -149

**East:** -144.5

**North:** 61.5

**South:** 59.7

**Publications:**

Bodkin, J. L., B. E. Ballachey, and D. Esler. 2002. Patterns and processes of population change in selected nearshore vertebrate predators. Exxon Valdez Oil Spill Restoration Project Annual Report (Restoration Project 01423).

Bodkin, J. L., T. A. Dean, and D. Esler. 2001. Patterns and processes of population change in selected nearshore vertebrate predators. Exxon Valdez Oil Spill Restoration Project Annual Report (Restoration Project 00423).

Esler, D. 1999. Time of day of ovulation by three duck species in subarctic Alaska. Condor 101: 422-425.

Esler, D. 2000. Applying metapopulation theory to conservation of migratory birds. Conservation Biology 14:366-372.

Esler, D. 2000. Harlequin duck demography during winter in Prince William Sound, Alaska: effects of the Exxon Valdez oil spill. Ph.D. dissertation, Oregon State University, Corvallis. 127pp.

Esler, D., D. M. Mulcahy, and R. L. Jarvis. 2000. Testing assumptions for unbiased estimation of survival of radio-marked harlequin ducks. Journal of Wildlife Management 64:591-598.

Esler, D., J. A. Schmutz, R. L. Jarvis, and D. M. Mulcahy. 2000. Winter survival of adult female harlequin ducks in relation to history of

- contamination by the Exxon Valdez oil spill. *Journal of Wildlife Management* 64:839-847.
- Esler, D., T. D. Bowman, C. E. O'Clair, T. A. Dean, and L. L. McDonald. 2000. Densities of Barrow's goldeneyes during winter in Prince William Sound, Alaska in relation to habitat, food, and history of oil contamination. *Waterbirds* 23:425-431.
- Esler, D., T. D. Bowman, K. A. Trust, B. A. Ballachey, T. A. Dean, S. C. Jewett, and C. E. O'Clair. 2000. Harlequin duck (*Histrionicus histrionicus*) perspective. Pages 4.1-4.49 In Holland-Bartels, L. E. (Ed.). *Mechanisms of impact and potential recovery of nearshore vertebrate predators following the Exxon Valdez oil spill*. Exxon Valdez Oil Spill Trustee Council Restoration Final Report (Restoration Study 95025-00025).
- Esler, D., T. D. Bowman, K. Trust, B. E. Ballachey, T. A. Dean, S. C. Jewett, and C. E. O'Clair. 2002. Harlequin duck population recovery following the Exxon Valdez oil spill: progress, process, and constraints. *Marine Ecology Progress Series* 241:271-286.
- Esler, D., T. D. Bowman, T. A. Dean, C. E. O'Clair, S. C. Jewett, and L. L. McDonald. 2000. Correlates of harlequin duck densities during winter in Prince William Sound, Alaska. *Condor* 102:920-926.
- Goatcher, B., D. Zwiefelhofer, R. Lanctot, K. Scribner, D. Esler, S. Talbot, and B. Pierson. 1998. Differentiation and Interchange of Harlequin Duck Populations Within the North Pacific. Exxon Valdez Oil Spill Restoration Project Final Report (Restoration Project 98161).
- Lanctot, R., B. Goatcher, K. Scribner, S. Talbot, B. Pierson, D. Esler, and D. Zwiefelhofer. 1999. Harlequin duck recovery from the Exxon Valdez oil spill: a population genetics perspective. *Auk* 116:781-791.
- Mather, D. D., and D. Esler. 1999. Evaluation of bursal depth as an indicator of age class of harlequin ducks. *Journal of Field Ornithology* 70:200-205.
- Mulcahy, D. M., and D. Esler. 1999. Surgical and immediate postrelease mortality of harlequin ducks implanted with abdominal radio transmitters with percutaneous antennae. *Journal of Zoo and Wildlife Medicine* 30:397-401.
- Mulcahy, D. M., D. Esler, and M. K. Stoskopf. 1999. Loss from harlequin ducks of abdominally implanted radio transmitters equipped with percutaneous antennas. *Journal of Field Ornithology* 70:244-250.
- Trust, K. A., D. Esler, B. R. Woodin, and J. J. Stegeman. 2000. Cytochrome P450 1A induction in sea ducks inhabiting nearshore areas of Prince William Sound, Alaska. *Marine Pollution Bulletin* 40:397-403.

**Population delineation of Prince William Sound harlequin ducks**

**Related Park:** Southwest Alaska Network  
**Project Affiliations:** Alaska Department of Fish and Game; National Fish and Wildlife Foundation  
**Website Address:** <http://www.state.ak.us/adfg/wildlife.duck/duck.htm>

**Primary Contact:**

Dan Rosenberg  
Alaska Department of Fish and Game  
525 W. 67th Ave  
Anchorage, AK 99518 United States  
Voice: (907)267-2453 fax: none given  
[dan\\_rosenberg@fishgame.state.ak.us](mailto:dan_rosenberg@fishgame.state.ak.us)

**Principal Investigators:**

**Hypotheses:**

Population Delineation, Migration, Philopatry

**Data Being Collected:**

Data being collected in 2003: Movement and Distribution

**Progress:** In work  
**First Year Collected:** 2003  
**Duration of Project:** 2004  
**Duration Descript:** 2003 – 2004

**West:** -148.5  
**East:** -146  
**North:** 60.5  
**South:** 59.5

**Publications:**

D.H. Rosenberg and M.P. Pertrula. In prep.. Population delineation of Prince William Sound harlequin ducks – A satellite telemetry approach. Annual Report. Alaska Dept. Fish and Game. Anchorage

**Map:**



## Seabird Research and Monitoring on Middleton Island

**Related Park:** Alaska Region  
**Project Affiliations:** US Geological Survey, Alaska Science Center  
**Website Address:** <http://www.absc.usgs.gov/staff/MFEB/shatch.php>

**Primary Contact:**

Scott Hatch  
US Geological Survey, Alaska Science Center  
1011 E. Tudor Road  
Anchorage, AK 99503 United States  
Voice: (907)786-3512 fax: none given  
Scott\_Hatch@usgs.gov

**Principal Investigators:**

**Hypotheses:**

- (1) Collect adipose tissue samples from black-legged kittiwakes, including individuals subjected to controlled diets of known prey types, for fatty acid signature analysis.
- (2) Monitor populations, productivity, survival, breeding chronology, and food habits of several species on Middleton including black-legged kittiwakes, pelagic cormorants, common murre, tufted puffins, rhinoceros auklets, and glaucous-winged gulls.

**Data Being Collected:**

As above.

**Progress:** In work **West:** -148

**First Year Collected:**

**East:** -145

**Duration of Project:**

**North:** 60

**Duration Descript:** Ongoing; will continue as long as funding permits.

**South:** 59

**Seasonal Movements and Distribution of wintering Steller's Eiders (*Polysticta stelleri*)**

**Related Park:** Southwest Alaska Network  
**Project Affiliations:** Alaska Department of Fish and Game; US Fish and Wildlife Service  
**Website Address:** <http://www.state.ak.us/adfg/wildlife.duck/duck.htm>

**Primary Contact:**

Dan Rosenberg  
Alaska Department of Fish and Game  
525 W. 67th Ave  
Anchorage, AK 99518 United States  
Voice: (907)267-2453 fax: none given  
[dan\\_rosenberg@fishgame.state.ak.us](mailto:dan_rosenberg@fishgame.state.ak.us)

**Principal Investigators:**

**Hypotheses:**

Abundance, Population Structure, Population Delineation, Migration, Philopatry, Distribution

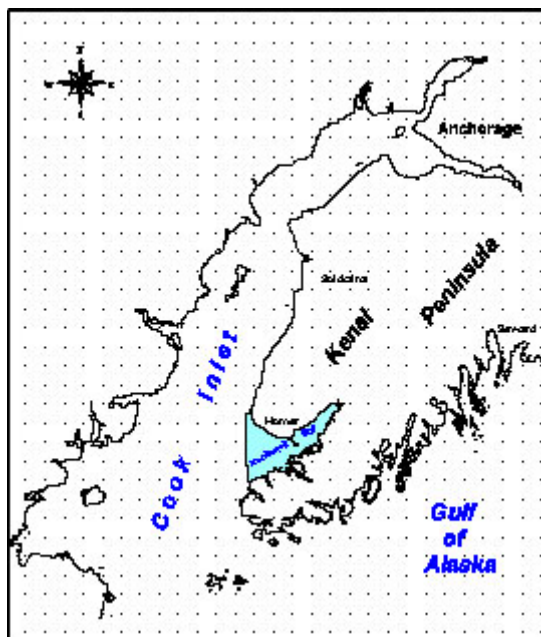
**Data Being Collected:**

Data being collected in 2003: Survey in lower Cook Inlet

**Progress:** In work  
**First Year Collected:** 2003  
**Duration of Project:** 2005  
**Duration Descript:** 2003-2005

**West:** -155  
**East:** -150.75  
**North:** 60.2  
**South:** 59

**Map:**





## Semidi Islands Seabird Research and Monitoring

**Related Park:** Alaska Region  
**Project Affiliations:** US Geological Survey, Alaska Science Center  
**Website Address:** Scott Hatch: <http://www.absc.usgs.gov/staff/MFEB/shatch.php>  
 USFWS Alaska Maritime National Wildlife Refuge: <http://www.r7.fws.gov/nwr/akmnwr/akmnwr.html>

### Primary Contact:

Scott Hatch  
 US Geological Survey, Alaska Science Center  
 1011 E. Tudor Road  
 Anchorage, AK 99503 United States  
 Voice: (907)786-3512 fax: none given  
 Scott\_Hatch@usgs.gov

### Principal Investigators:

Vernon Bird  
 US Fish and Wildlife Service  
 2355 Kachemak Drive, Ste.101  
 Homer, AK 99603 United States  
 Voice: (907)235-6546 fax: none given  
 Vernon\_Byrd@fws.gov

### Hypotheses:

- (1) Obtain samples of adipose tissue from adult and young-of-the-year northern fulmars for analysis of fatty acid profiles and development of techniques for assessing seabird diets through fatty acid signature analysis.
- (2) Deploy satellite transmitters on breeding northern fulmars at the Semidi Islands and track birds to wintering areas during 2003-2004.
- (3) Monitor population sizes, productivity, survival, and breeding chronology of several seabird species on the Semidi Islands for addition to long-term data sets at this site.

### Data Being Collected:

Adipose tissue samples (via live biopsy) from northern fulmars; Argos satellite telemetry locations from four northern fulmars (beginning August 2003); catalog of fulmar culmen markings for individual identification and monitoring of adult survival in northern fulmars; estimates of annual breeding productivity in northern fulmars, black-legged kittiwakes, thick-billed and common murre.

**Progress:** In work

**First Year Collected:**

**Duration of Project:**

**Duration Descript:** 1-year, with possible follow-up visits in 2004 for additional fat sampling in northern fulmars.

**West:** -157

**East:** -156

**North:** 56.25

**South:** 55.95

### **Publications:**

See websites given above for Hatch and Byrd for bibliographies from long-term research and monitoring on the Semidi Islands.

## Small boat and aerial survey of waterfowl in Kachemak Bay, Alaska

**Related Park:** Southwest Alaska Network  
**Project Affiliations:** Alaska Department of Fish and Game; National Fish and Wildlife Foundation  
**Website Address:** <http://www.state.ak.us/adfg/wildlife.duck/duck.htm>

### Primary Contact:

Michael Petrula  
 Alaska Department of Fish and Game  
 525 W. 67th Ave  
 Anchorage, AK 99518 United States  
 Voice: (907)267-2153 fax: none given  
 michael\_petrula@fishgame.state.ak.us

### Principal Investigators:

Dan Rosenberg  
 Alaska Department of Fish and Game  
 525 W. 67th Ave  
 Anchorage, AK 99518 United States  
 Voice: (907)267-2453 fax: none given  
 dan\_rosenberg@fishgame.state.ak.us

### Hypotheses:

Long-term Monitoring

### Data Being Collected:

Data being collected in 2003: Survey

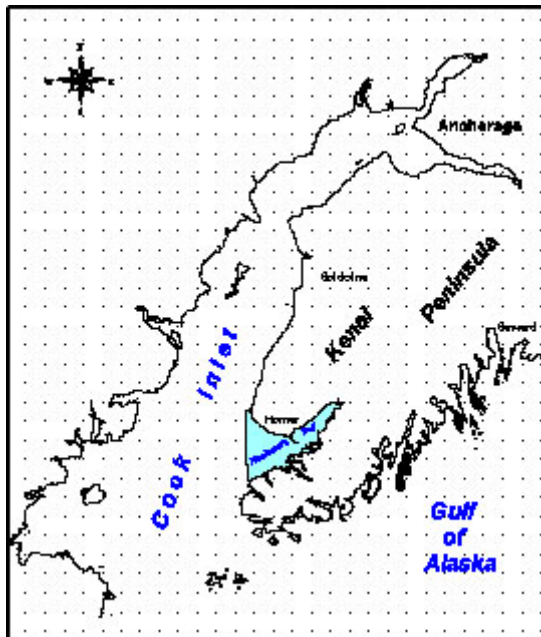
**Progress:** In work  
**First Year Collected:** 1999  
**Duration of Project:** 2003  
**Duration Descript:** 1999-2003

**West:** -152  
**East:** -150.75  
**North:** 59.9  
**South:** 59.3

### Publications:

Petrulya, M.J. and D.H. Rosenberg. Small Boat Aerial Survey of Waterfowl in Kachemak Bay, Alaska during Winter. Alaska Dept. Fish and Game. Anchorage. Annual Reports available from 1999-2002

### Map:



## Canada-USA Shelf Salmon Survival Study

**Related Park:** Alaska Region  
**Project Affiliations:** Fisheries and Oceans Canada/Institute of Ocean Sciences; Bonneville Power Authority  
**Website Address:** none given

### Primary Contact:

David Welch  
 Fisheries and Oceans Canada/Institute of Ocean Sciences  
 Pacific Biological Station  
 Hammond Bay Road  
 Nanaimo, BC V9T 6N7 Canada  
 Voice: (250)756-7218 fax: (250)756-7053  
 welchd@pac.dfo-mpo.gc.ca

### Principal Investigators:

### Hypotheses:

The primary objective of this study is to obtain a single coast-wide set of data that will allow US and Canadian scientists to begin identifying broad regions of good or poor salmon growth in the ocean, and to begin defining the reasons why growth differs between regions. Based on these preliminary results it will be possible to refine sampling locations for future years and determine the appropriate sampling frequency that is needed. A secondary goal will be to establish which specific stocks of salmon remain resident in the areas of poorest growth, and to therefore begin to develop some understanding of why marine survival may differ between different stocks of salmon in the ocean.

### Data Being Collected:

Data being collected in 2003: Salmon & oceanographic data collection off SE will occur in March, June, and October of 2003. Data collection includes: CTD stations, Surface Chl-a, Zooplankton from double Bongo-tow, abundance (CPUE) of each salmon species, size (length and weight), stomach contents, fat content, and Cesium content (for bioenergetic analysis).

**Progress:** In work

**West:** -140

**First Year Collected:**

**East:** -143

**Duration of Project:**

**North:** 60

**Duration Descript:** Ongoing-- multi-year.

**South:** 47

### Publications:

- Welch D. W., J. F. T. Morris, E. Demers, and J.P. Eveson. 2002. CCGS W.E. Ricker Gulf of Alaska salmon survey, October, 1996. Can. Data Rep. Fish. Aquat. Sci. 1100: 64 p.
- Welch D. W., J. F. T. Morris, E. Demers, and J.P. Eveson. 2002. CCGS W.E. Ricker Gulf of Alaska salmon survey, October, 1996. Can. Data Rep. Fish. Aquat. Sci. 1100: 64 p.
- Welch, D. W., J. F. T. Morris, A. R. Ladouceur, S. Tucker, and E. Demers. 2002. CCGS W.E. Ricker Gulf of Alaska salmon surveys, 1998. Can. Data Rep. Fish. Aquat. Sci. 1103: 69 p.
- Welch, D. W., J. F. T. Morris, A. R. Ladouceur, S. Tucker, and E. Demers. 2002. CCGS W.E. Ricker Gulf of Alaska salmon surveys, 1999. Can. Data Rep. Fish. Aquat. Sci. 1104: 113 p.
- Welch, D. W., J. F. T. Morris, and E. Demers. 2002. CCGS W.E. Ricker Gulf of Alaska salmon survey, November - December, 1997. Can. Data Rep. Fish. Aquat. Sci. 1102: 45 p.
- Welch, D. W., J. F. T. Morris, E. Demers, and B. L. Wing. 2002. F.V. Columbia Gulf of Alaska salmon survey, October 7 - November 10, 1995. Can. Data Rep. Fish. Aquat. Sci. 1099: 112p.
- Welch, D. W., J. F. T. Morris, E. Demers, and H. R. Carlson. 2002. F.V. Anita J. Gulf of Alaska salmon survey, March 25 - April 9, 1995. Can. Data Rep. Fish. Aquat. Sci. 1097: 19 p.
- Welch, D. W., J. F. T. Morris, E. Demers, and H.R. Carlson. 2002. CCGS W.E. Ricker Gulf of Alaska salmon survey, October 2-20, 1995. Can. Data Rep. Fish. Aquat. Sci. 1098: 23 p.

## GLOBEC 2000: Factors affecting the distribution of juvenile salmon in the Gulf of Alaska

**Related Park:** Southwest Alaska Network  
**Project Affiliations:** Global Ocean Ecosystem Dynamics  
**Website Address:** none given

### Primary Contact:

E. D. Cokelet  
 NOAA, Pacific Marine Environmental Laboratory  
 7600 Sand Point Way, NE  
 Seattle, WA 98115 United States  
 Voice: (206)526-6820 fax: none given  
 Edward.D.Cokelet@noaa.gov

### Principal Investigators:

J.H. Helle  
 NOAA, Alaska Fisheries Science Center, Auke Bay Laboratory  
 11305 Glacier Highway  
 Juneau, AK 99801 United States  
 Voice: (907)789-6038 fax: none given  
 Jack.Helle@noaa.gov

E.V. Farley, Jr  
 NOAA, Alaska Fisheries Science Center, Auke Bay Laboratory  
 11305 Glacier Highway  
 Juneau, AK 99801 United States  
 Voice: (907)789-6085 fax: none given  
 Ed.Farley@noaa.gov

A.B. Hollowed  
 NOAA, Pacific Marine Environmental Laboratory  
 7600 Sand Point Way, NE  
 Seattle, WA 98115 United States  
 Voice: (206)526-4223 fax: none given  
 Anne.Hollowed@noaa.gov

P.J. Stabeno  
 NOAA, Pacific Marine Environmental Laboratory  
 7600 Sand Point Way, NE  
 Seattle, WA 98115 United States  
 Voice: (206)526-6453 fax: none given  
 Phyllis.J.Stabeno@noaa.gov

### Hypotheses:

Remarkable changes in atmospheric, oceanic and biological conditions have occurred in recent decades in the North Pacific Ocean including declines in the marine survival of some salmon stocks. Fishery scientists generally agree that in the first few months after leaving freshwater, salmon survival and growth are linked to oceanic variability. The purpose of this research is to focus National Marine Fisheries Service studies on the GLOBEC region, augment oceanographic measurements and determine what biological and physical factors influence the distribution of juvenile salmon. Three general hypotheses are explored in this proposal:

- (1) juvenile salmon prefer the buoyancy-driven Alaska Coastal Current (ACC) at the head of the Gulf of Alaska,
- (2) they associate with oceanic temperature, salinity, current and prey fields, and
- (3) they migrate landward of Kodiak Island in the ACC rather than seaward in the Alaskan Stream.

Annual, summer cruises aboard a chartered fishing vessel will catch juvenile salmon on 10 transects between Yakutat Bay and Kodiak Island. The vessel will be outfitted with a thermosalinograph to measure sea-surface temperature and salinity, and with an Acoustic Doppler Current Profiler (ADCP) - each operating continuously for fine-scale resolution. Modeled tidal currents will be removed from ADCP measurements to reveal the mean flow fields. At each trawl site, temperature and salinity profiles will provide water-column properties, and bongo-net hauls will give zooplankton distributions. Stomach samples from juvenile salmonids will be analyzed in the laboratory for diet composition and compared with zooplankton distributions. Analysis of salmon otoliths for hatchery thermal marks and Genetic Stock Identification techniques will be used to determine the home stream of hatchery and wild stocks in the Gulf of Alaska and their distribution with respect to oceanographic regimes. Retrospective analysis of catch per unit effort versus oceanographic and prey factors will reveal what affects the distribution of pink, chum, coho and sockeye salmon in the study region. Proxies for bio-physical factors will be developed and compared with salmon-run size.

### Data Being Collected:

Year 2003 - Sea-surface temperature, salinity, fluorescence and nutrients. Temperature, salinity and fluorescence profiles from CTD casts at each station. Currents from ADCP and satellite-tracked drifting buoys. Surface zooplankton net tows. Juvenile salmon distribution, migration, size and condition in relation to oceanographic features from surface trawls.

**Data Collected in the past 2 years:**

Sea-surface temperature, salinity, fluorescence and nutrients. Temperature, salinity and fluorescence profiles from CTD casts at each station. Currents from ADCP and satellite-tracked drifting buoys. Surface zooplankton net tows. Juvenile salmon distribution, migration, size and condition in relation to oceanographic features from surface trawls.

<b><u>Progress:</u></b>	In work	<b><u>West:</u></b>	-157
<b><u>First Year Collected:</u></b>	2001	<b><u>East:</u></b>	-136
<b><u>Duration of Project:</u></b>	2005	<b><u>North:</u></b>	62
<b><u>Duration Descript:</u></b>		<b><u>South:</u></b>	54

**Publications:**

Cokelet, E. D., P. J. Stabeno and A. J. Jenkins, "Factors affecting the distribution of juvenile salmon in the Gulf of Alaska: Physical oceanography," poster presented at the "Marine Science in the Northeast Pacific: Science for Resource Dependent Communities" symposium, 13-17 January 2003, Anchorage.  
([http://globec.coas.oregonstate.edu/groups/nep/reports/si\\_mtgs/si\\_jan03/si\\_03\\_cokelet\\_01.pdf](http://globec.coas.oregonstate.edu/groups/nep/reports/si_mtgs/si_jan03/si_03_cokelet_01.pdf))

Farley, E. V., Jr. and J. H. Helle, "Factors affecting the distribution of juvenile Prince William Sound hatchery pink salmon in the Gulf of Alaska," poster presented at the "Marine Science in the Northeast Pacific: Science for Resource Dependent Communities" symposium, 13-17 January 2003, Anchorage. ([http://globec.coas.oregonstate.edu/groups/nep/reports/si\\_mtgs/si\\_jan03/si\\_03\\_farley\\_01.pdf](http://globec.coas.oregonstate.edu/groups/nep/reports/si_mtgs/si_jan03/si_03_farley_01.pdf))

Farley, E.V., Jr., B.L. Wing, E.D. Cokelet, C.M. Kondzela, E.C. Martinson, N. Weemes, J.H. Moss, M. Auburn-Cook, and C. Fitch (2001), Gulf of Alaska coastal research on juvenile salmon, July and August 2001, pp. 19, North Pacific Anadromous Fish Commission Document 559, Auke Bay Laboratory, Alaska Fisheries Science Center, NMFS, NOAA, 11305 Glacier Highway, Juneau, AK 99801-862.

## Gulf of Alaska Biennial Bottom Trawl Survey of Groundfish Resources

**Related Park:** Alaska Region  
**Project Affiliations:** National Marine Fisheries Service  
**Website Address:** <http://www.afsc.noaa.gov/>

### Primary Contact:

Mark Wilkins  
 National Marine Fisheries Service  
 7600 Sand Point Way, NE  
 Seattle, WA 98115 United States  
 Voice: (206)526-4104 fax: (206)526-6723  
 Mark.Wilkins@noaa.gov

### Principal Investigators:

### Hypotheses:

The major survey objective is to extend the biennial time series monitoring trends in distribution and abundance of important groundfish species begun in 1999 and to describe and measure various biological and environmental parameters. Between 1984 and 1999 these surveys were conducted triennially. Results of the survey are used in most of the stock assessments that are developed for Gulf of Alaska groundfish species. Data and specimens for various biological studies are also collected during this work.

### Data Being Collected:

The survey is being conducted in 2003 between May 20 and August 9 aboard three chartered commercial trawlers. Data on fishing effort, environmental variables, catch rate, and biological characteristics of various species are being collected at pre-selected stations throughout the Gulf of Alaska.

<b><u>Progress:</u></b>	In work	<b><u>West:</u></b>	-170
<b><u>First Year Collected:</u></b>	1984	<b><u>East:</u></b>	-132
<b><u>Duration of Project:</u></b>		<b><u>North:</u></b>	61
<b><u>Duration Descript:</u></b>	This biennial bottom trawl series is planned to continue indefinitely.	<b><u>South:</u></b>	47

### Publications:

Britt, L. L., and M. H. Martin. 2000. Data report: 1999 Gulf of Alaska bottom trawl survey, 249 p. NTIS No. PB2001-105324.  
 Martin, M. H. 1997. Data report: 1996 Gulf of Alaska bottom trawl survey, 235 p. NTIS No. PB98- 103930.  
 Martin, M. H., and D. M. Clausen. 1995. Data report: 1993 Gulf of Alaska bottom trawl survey, 217 p. NTIS No. PB96-135561.  
 Stark, J. W., and D. M. Clausen. 1995. Data report: 1990 Gulf of Alaska bottom trawl survey, 221 p. NTIS No. PB95-194825.

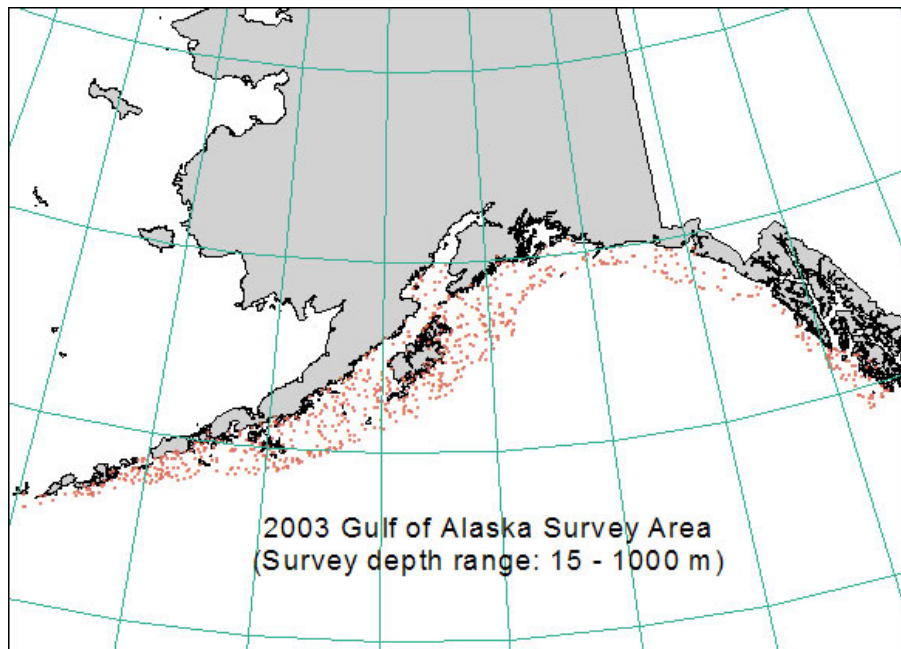
### Comments:

A short Cruise Results is released within two months after the conclusion of the survey summarizing the number and location of samples, preliminary estimates of CPUE, and an indication of abundance trends. A Report to Industry is compiled and released approximately six months after the survey that depicts the distribution and relative abundance of various commercially important species from the survey results. A Data Report is published approximately 12 months following the survey, which includes more detailed analyses of abundance, distribution, size and age composition, and other biological information about fish and invertebrates in the region derived from survey results. Results of the survey are also used in virtually all stock assessments of Gulf of Alaska groundfish.

**Map Description:**

Gulf of Alaska continental shelf and upper continental slope between Dixon Entrance (132°30'W longitude) and the Islands of the Four Mountains (170°W longitude) at depths from 15-1,000 m.

**Map:**



Gulf of Alaska continental shelf and upper continental slope between Dixon Entrance (132 30'W longitude) and the Islands of the Four Mountains (170 W longitude) at depths from 15-1,000 m.

## Kamishak Bay herring stock assessment

**Related Park:** Southwest Alaska Network  
**Project Affiliations:** Alaska Department of Fish and Game  
**Website Address:** none given

**Primary Contact:**

Ted Otis  
 Alaska Department of Fish and Game  
 3298 Douglas Place  
 Homer, AK 99603 United States  
 Voice: (907)235-1723 fax: none given  
 Ted\_Otis@fishgame.state.ak.us

**Principal Investigators:**

**Hypotheses:**

Monitor stock status (abundance, and composition, spawning distribution) of herring spawning in Kamishak Bay

**Data Being Collected:**

Data being collected in 2003: Aerial and vessel survey observations of herring distribution and abundance, spawning locations, and age, sex, and size distribution of spawning fish

**Progress:** In work

**First Year Collected:**

**Duration of Project:**

**Duration Descript:** Conducted annually from ~April 20-June 10, since 1978

**West:** -155

**East:** -149.5

**North:** 60.5

**South:** 58.7

**Publications:**

Alaska Department of Fish and Game, Division of Commercial Fisheries. 2002. Kamishak Bay Data Synthesis, Version 1.0, 13 December 2002. CD-ROM. Homer, Alaska.

Hammarstrom, L.F., and E.O. Otis. 2001. Overview of the Lower Cook Inlet area commercial herring fishery and recent stock status: A report to the Alaska Board of Fisheries. Alaska Department of Fish and Game, Regional Information Report No. 2A01-17. 28 pp.

Otis, E.O. 2000. Forecast of the Kamishak herring stock in 2000. Alaska Department of Fish and Game, Regional Information Report No. 2A00-14. 40 pp.

Otis, E.O. and M. Spahn. 2003. Improving access to ADF&G's Lower Cook Inlet Pacific herring stock assessment and commercial fishery databases, including observations of Steller sea lions. National Marine Fisheries Service, Steller Sea Lion Research Initiative Final Report (NOAA Award NA16FX1411), Alaska Department of Fish and Game, Division of Commercial Fisheries, Homer, Alaska. 7 pp.

Otis, E.O. and W.R. Bechtol. 1997. Forecast of the Kamishak herring stock in 1997. Alaska Department of Fish and Game, Regional Information Report No. 2A97-03.

Otis, E.O., and W.A. Bucher. 1998. Review of the 1998 Lower Cook Inlet area commercial herring fishery: Report to the Alaska Board of Fisheries. Alaska Department of Fish and Game Regional Information Report 2A98-36. 16 pp.

Otis, E.O., and W.R. Bechtol. 1999. Lower Cook Inlet Herring: Stock Structure and Aerial Survey Assessment. Alaska Department of Fish and Game, Project Operational Plan. 14 pp.

Otis, E.O., W.R. Bechtol, and W.A. Bucher. 1998. Coping with a challenging stock assessment situation: the Kamishak Bay sac-roe herring fishery. Pages 557-573 In Fishery Stock Assessment Models: Proceedings of the International Symposium on Fishery Stock Assessment Models for the 21st Century, October 8-11, 1997, Anchorage, Alaska. Eds. F. Funk, T.J. Quinn, J. Heifetz, J.N. Ianelli, J.E. Powers, J.F. Schweigert, P.J. Sullivan, and C.-I. Zhang. University of Alaska Sea Grant College Program AK-SG-98-01.

**Map Description:**

Map of the Lower Cook Inlet management area, including the 5 management districts and 35 index streams on which ADF&G monitors salmon escapements.



**Lower Cook Inlet Salmon Index Streams**

This map illustrates the distribution of salmon index streams within the Lower Cook Inlet region of Alaska. The area is divided into four administrative districts: Kamishak Bay District, Southern, Outer District, and Eastern District. The Kamishak Bay District is located on the western side of the inlet, featuring several large rivers and creeks. The Southern district is situated in the central part of the inlet, while the Outer District is located to the east of the Southern district. The Eastern District is the easternmost part of the region, characterized by a complex network of smaller creeks and lagoons. The map also shows the Barren Islands to the south of the Kamishak Bay District. A compass rose in the top left corner indicates the cardinal directions, and a scale bar in the bottom right corner shows distances up to 60 miles.

**Map Labels:**

- Kamishak Bay District:** Iniskin River, Cottonwood Creek, Browns Peak Cr., Ursus River, Bruin River, Sunday Creek, Amakdedori Creek, Chenik Lake, Mikfik Creek, Big Kamishak River, Douglas River Left, Little Kamishak River.
- Southern:** Barabara Creek, Tulka Cr., Seldovia River, Port Graham River, English Bay River, Dogfish Lagoon, Port Chatham, Windy Creek (Left and Right), Rocky River, Island Cr., Petrof River, China Post Cr., Humpy Cr., James Lagoon.
- Outer District:** Salmon, Mayor, Airport Creeks, Grouse Cr., Bear Cr., Humpy Cove, Tonsina Creek, Aialik Lake (Cr.), Desire Lake (Cr.), Delight Lake.
- Eastern District:** (No specific labels within this district on the map).
- Barren Islands:** (Labeled on the map).

Oceanic and Nearshore Research and Monitoring Summaries  
April 2004

## Lower Cook Inlet salmon catch and escapement monitoring

**Related Park:** Southwest Alaska Network  
**Project Affiliations:** Alaska Department of Fish and Game  
**Website Address:** none given

**Primary Contact:**

Ted Otis  
 Alaska Department of Fish and Game  
 3298 Douglas Place  
 Homer, AK 99603 United States  
 Voice: (907)235-1723 fax: none given  
 Ted\_Otis@fishgame.state.ak.us

**Principal Investigators:**

**Hypotheses:**

Monitor commercial catch and escapements for in-season management of commercial fisheries and collect age, sex, size data to characterize the catch.

**Data Being Collected:**

Data being collected in 2003:  
 - Annual escapement indices for streams supporting commercial harvests of pink, chum, and/or sockeye salmon (pink and chum escapement indices are based on area-under-the-curve estimates derived from periodic aerial and/or foot surveys, sockeye escapements are peak aerial counts or estimates derived from weirs and/or remote video escapement recorders);  
 - Daily and weekly in-season catch reports to monitor harvests from individual fishery subdistricts.  
 -Age (scales), weight, length, and sex composition information from commercial landings, and from salmon escaping to

<b><u>Progress:</u></b>	In work	<b><u>West:</u></b>	-155
<b><u>First Year Collected:</u></b>	1950	<b><u>East:</u></b>	-149.5
<b><u>Duration of Project:</u></b>		<b><u>North:</u></b>	60.5
<b><u>Duration Descript:</u></b>	Salmon catch and escapements in Lower Cook Inlet have been monitored annually since the 1950's	<b><u>South:</u></b>	58.7

**Publications:**

- Hammarstrom, L.F., and M.S. Dickson. 2003. 2002 Lower Cook Inlet Annual Finfish Management Report. Alaska Department of Fish and Game Regional Information Report No. 2A03-04. 161 pp.
- Otis, E.O. 1997. Lower Cook Inlet pink salmon forecast for 1997. Alaska Department of Fish and Game Regional Information Report No. 2A97-09.
- Otis, E.O. 2001. Report to the Alaska Board of Fisheries on sustainable escapement goals for chum, pink, and sockeye salmon in Lower Cook Inlet. Alaska Department of Fish and Game, Regional Information Report No. 2A01-21. 60 pp.
- Otis, E.O., and M. Dickson. 2000. Improved salmon escapement enumeration using remote video and time-lapse recording technology. Exxon Valdez Oil Spill Restoration Project Annual Report (Restoration Project 99366), Alaska Department of Fish and Game, Division of Commercial Fisheries, Homer, Alaska. 26 pp.
- Otis, E.O., and M. Dickson. 2002. Improved salmon escapement enumeration using remote video and time-lapse recording technology. Exxon Valdez Oil Spill Restoration Project Final Report (Restoration Project 00366), Alaska Department of Fish and Game, Division of Commercial Fisheries, Homer, Alaska. 29 pp.
- Otis, E.O., and M.S. Dickson. 1999a. Abundance, age, sex, and size statistics for sockeye, chum, and pink salmon in Lower Cook Inlet, 1996. Alaska Department of Fish and Game Regional Information Report No. 2A 99-09. 58 pp.
- Otis, E.O., and M.S. Dickson. 1999b. Abundance, age, sex, and size statistics for sockeye, chum, and pink salmon Delight Lake past the Delight Creek weir. in Lower Cook Inlet, 1997. Alaska Department of Fish and Game Regional Information Report No. 2A 99-35. 58 pp.
- Otis, E.O., and M.S. Dickson. 1999c. Abundance, age, sex, and size statistics for sockeye, chum, and pink salmon in Lower Cook Inlet, 1998. Alaska Department of Fish and Game Regional Information Report No. 2A 99-36. 60 pp.

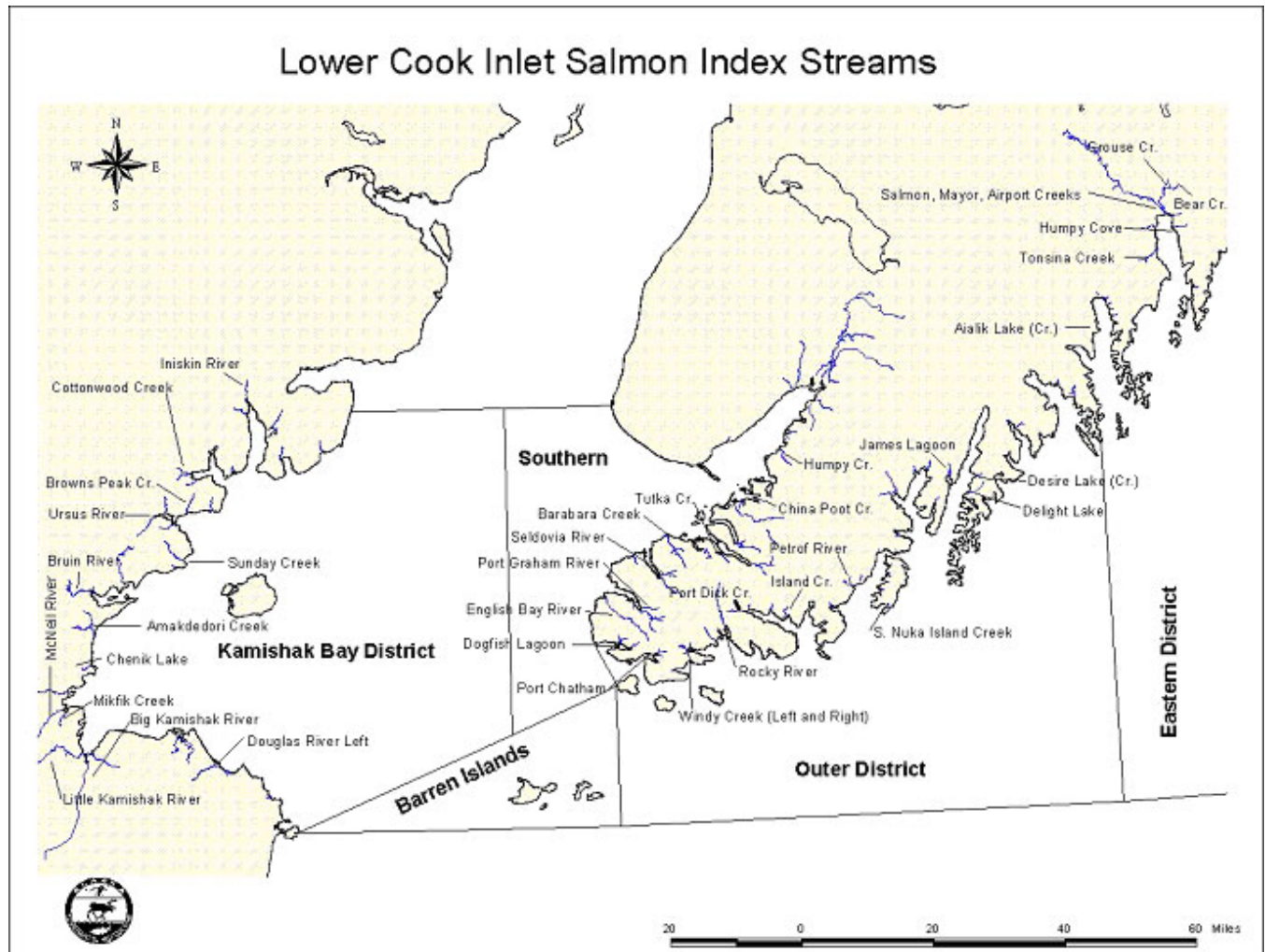
Otis, E.O., and M.S. Dickson. 2002. Abundance, age, sex, and size statistics for sockeye, chum, and pink salmon in Lower Cook Inlet, 1999. Alaska Department of Fish and Game Regional Information Report No. 2A 00-15. 63 pp.

Otis, E.O., W.R. Bechtol, and W.A. Bucher. 1998. Abundance, age, sex, and size statistics for sockeye salmon in Lower Cook Inlet, 1995. Alaska Department of Fish and Game Regional Information Report No. 2A98-07. 36 pp.

**Map Description:**

Map of the Lower Cook Inlet management area, including the 5 management districts and 35 index streams on which ADF&G monitors salmon escapements.

**Map:**



## Resource Ecology and Ecosystem Modeling Program

**Related Park:** Southwest Alaska Network  
**Project Affiliations:** NOAA, National Marine Fisheries Service  
**Website Address:** <http://www.afsc.noaa.gov/refm/reem/Default.htm>

**Primary Contact:**

Pat Livingston  
 National Marine Fisheries Service  
 7600 Sand Point Way, NE  
 Seattle, WA 98115 United States  
 Voice: (206)526-4242 fax: none given  
[pat.livingston@noaa.gov](mailto:pat.livingston@noaa.gov)

**Principal Investigators:**

**Hypotheses:**

The Resource Ecology and Ecosystem Modeling Task at the Alaska Fisheries Science Center focuses on the collection and analysis of data relating to trophic interactions in the North Pacific and incorporation of these data into environmental assessments and single-species and multispecies models. Systematic collection and analysis of groundfish food habits data is performed. Data on size-at-age is integrated with bioenergetic information to estimate food consumption rates by fish populations. Information on marine mammal and bird diet is obtained from other Center programs or outside researchers. Quantifying food web linkages is essential to increase our understanding of how external forces such as fishing may cause unanticipated shifts in ecosystem composition. The importance of this research is also elevated given the increasing emphasis on fishery-mammal interactions: groundfish predation interactions are an important part of knowing the true nature of resource availability to mammals and birds.

Stomach samples are collected at virtually no cost to the program, utilizing fishery observers and existing assessment cruises for collection platforms. Samples are analyzed in the laboratory and entered into a food habits database. These data allow assessment of factors influencing individual species food habits, including interannual changes. Predation effects by groundfish populations are then quantified and incorporated into assessment models.

**Data Being Collected:**

Data being collected in 2003: In the GOA: Stomach samples from arrowtooth flounder, walleye pollock, Pacific cod, Pacific halibut, sablefish, Atka mackerel, Alaska skate, big skate, giant grenadier, silvergray rockfish, yellowtail rockfish, and shortspine thornyhead.

**Progress:** In work

**First Year Collected:**

**Duration of Project:**

**Duration Descript:** Biennial collections on shelf-wide survey, annual collections in NMFS Pavlov Bay shrimp survey and ADF&G summer large mesh survey in Barnabas and Chiniak Gullies.

**West:** -169.5

**East:** -141

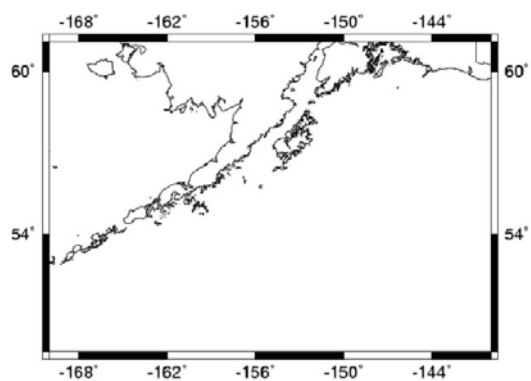
**North:** 61.25

**South:** 52

**Publications:**

See program web site for list of publications.

**Map:**



## Southeast Alaska Coastal Monitoring (SECM)

**Related Park:** Alaska Region  
**Project Affiliations:** National Marine Fisheries Service  
**Website Address:** <http://www.afsc.noaa.gov/abl/>  
<http://www.afsc.noaa.gov/abl/MarSalm/4secm.htm>

### Primary Contact:

Joe Orsi  
 National Marine Fisheries Service  
 11305 Glacier Highway  
 Juneau, AK 99801 United States  
 Voice: (907)789-6034 fax: none given  
[joe.orsi@noaa.gov](mailto:joe.orsi@noaa.gov)

### Principal Investigators:

Emily A. Ferguson  
 National Marine Fisheries Service  
 11305 Glacier Highway  
 Juneau, AK 99801 United States  
 Voice: none given fax: none given

Donald Mortensen  
 National Marine Fisheries Service  
 11305 Glacier Highway  
 Juneau, AK 99801 United States  
 Voice: none given fax: none given

William R. Heard  
 National Marine Fisheries Service  
 11305 Glacier Highway  
 Juneau, AK 99801 United States  
 Voice: none given fax: none given

Molly Sturdevant  
 National Marine Fisheries Service  
 11305 Glacier Highway  
 Juneau, AK 99801 United States  
 Voice: none given fax: none given

Alex Wertheimer  
 National Marine Fisheries Service  
 11305 Glacier Highway  
 Juneau, AK 99801 United States  
 Voice: none given fax: none given

### Hypotheses:

The primary goal of the Southeast Alaska Coastal Monitoring (SECM) research is to build and maintain a time series of biophysical oceanographic indices related to the seasonal growth, distribution, abundance, and habitat utilization of juvenile salmon stocks. Another goal is to examine relationships between juvenile salmon and ecologically-related species. According to research needs identified by the Auke Bay Laboratory and international science programs (North Pacific Anadromous Fish Commission and Global Ocean Ecosystem Dynamics) long term sampling commitment over varying environmental conditions is needed to better understand relationships between early marine growth and survival, and between marine habitat utilization and carrying capacity of salmon.

### Data Being Collected:

Data being collected in 2003: At most stations:  
 - CTD (temp, salinity, and sigma-t) to 200m,  
 - surface chlorophyll/nutrients,  
 - 20-m Norpac vertical zooplankton haul (243 mesh),  
 - double oblique BONGO tow to 200m (333 and 505 mesh),  
 - surface trawling (NORDIC 264 trawl) for juvenile salmon and ecologically related species, and  
 - salmon predator stomach analysis.

**Progress:** In work

**West:** -137

**First Year Collected:** 1997

**East:** -132

**Duration of Project:** 2005

**North:** 58.3

**Duration Descript:**

**South:** 57

**Publications:**

Courtney, D.L., D.G. Mortensen, J.A. Orsi, K.M. Munk. 2000. Origin of juvenile Pacific salmon recovered from southeastern Alaska identified by otolith marks and coded wire tags. *Fish. Res.* 46: 267–278.

Murphy, J.M. and J.A. Orsi. 1999. Physical oceanographic observations collected aboard the NOAA Ship John N. Cobb in the northern region of southeastern Alaska, 1997 and 1998. NOAA Proc. Rep. AFSC 99-02. 239p.

Murphy, J.M., A.L.J. Brase, and J.A. Orsi. 1999. An ocean survey of juvenile salmon in the northern region of southeastern Alaska, May–October 1997. NOAA Tech. Memo NMFS-AFSC-105. 40p. Auke Bay Laboratory, Alaska Fisheries Science Center, National Marine Fisheries Service, NOAA, 11305 Glacier Highway, Juneau, AK 99801-8626, USA.

Orsi, J. A., E. A. Fergusson, W. R. Heard, D. G. Mortensen, M. V. Sturdevant, A. C. Wertheimer, and B. L. Wing. 2002. Survey of juvenile salmon in the marine waters of southeastern Alaska, May–September 2001. (NPAFC Doc. 630) Auke Bay Laboratory, Alaska Fisheries Science Center, National Marine Fisheries Service, NOAA, U.S. Dept. Commerce, 11305 Glacier Highway, Juneau, AK 99801-8626, USA, 51 p.

Orsi, J.A., D.G. Mortensen, and J.M. Murphy. 1999. Early marine ecology of pink and chum salmon in southeastern Alaska. In: Proceedings of the 19th Northeast Pacific Pink and Chum Salmon Workshop. March 3–5 1999. pp. 64–72. Juneau, Alaska.

Orsi, J.A., J.M. Murphy, and A.L.J. Brase. 1997. Survey of juvenile salmon in marine waters of southeastern Alaska, May–August 1997. (NPAFC Doc. 277) 27p. Auke Bay Laboratory, Alaska Fisheries Science Center, National Marine Fisheries Service, NOAA, 11305 Glacier Highway, Juneau, AK 99801-8626, USA.

Orsi, J.A., J.M. Murphy, and D.G. Mortensen. 1998. Survey of juvenile salmon in marine waters of southeastern Alaska, May–August 1998. (NPAFC Doc. 346) 26p. Auke Bay Laboratory, Alaska Fisheries Science Center, National Marine Fisheries Service, NOAA, 11305 Glacier Highway, Juneau, AK 99801-8626, USA.

Orsi, J.A., M.V. Sturdevant, A.C. Wertheimer, B.L. Wing, J.M. Murphy, D.G. Mortensen, E.A. Fergusson, and B.K. Krauss. 2001. Survey of juvenile salmon in the marine waters of southeastern Alaska, May–September 2000. (NPAFC Doc. 536) 49 p. Auke Bay Laboratory, Alaska Fisheries Science Center, National Marine Fisheries Service, NOAA, U.S. Dept. Commerce, 11305 Glacier Highway, Juneau, AK 99801-8626, USA.

Orsi, J.A., M.V. Sturdevant, J.M. Murphy, D.G. Mortensen, and B.L. Wing. 2000. Seasonal habitat use and early marine ecology of juvenile Pacific salmon in southeastern Alaska. *N. Pac. Anadr. Fish Comm. Bull. No. 2*: 111-122.

Orsi, J.A., M.V. Sturdevant, J.M. Murphy, D.G. Mortensen, B.L. Wing, A.C. Wertheimer, and W.R. Heard. 2001. Southeast Alaska coastal monitoring for habitat use and early marine ecology of juvenile Pacific salmon. p.38. In: R. Beamish, Y. Ishida, V. Karpenko, P. Livingston, and K. Myers (eds.) North Pacific Anadromous Fish Commission Technical Report 2. Vancouver, Canada. NPAFC Workshop on factors affecting production of juvenile salmon: comparative studies on juvenile salmon ecology between the East and West North Pacific Ocean. October 29 2000. Tokyo, Japan.

Orsi, J.A., M.V. Sturdevant, J.M. Murphy, D.G. Mortensen, B.L. Wing, and B.K. Krauss. 2000. Survey of juvenile salmon in marine waters of southeastern Alaska, May–October 1999. (NPAFC Doc. 497) 51p. Auke Bay Laboratory, Alaska Fisheries Science Center, National Marine Fisheries Service, NOAA, 11305 Glacier Highway, Juneau, AK 99801-8626, USA.

**Comments:**

Type and location (latitude/longitude) of development, experiments, transects, etc:

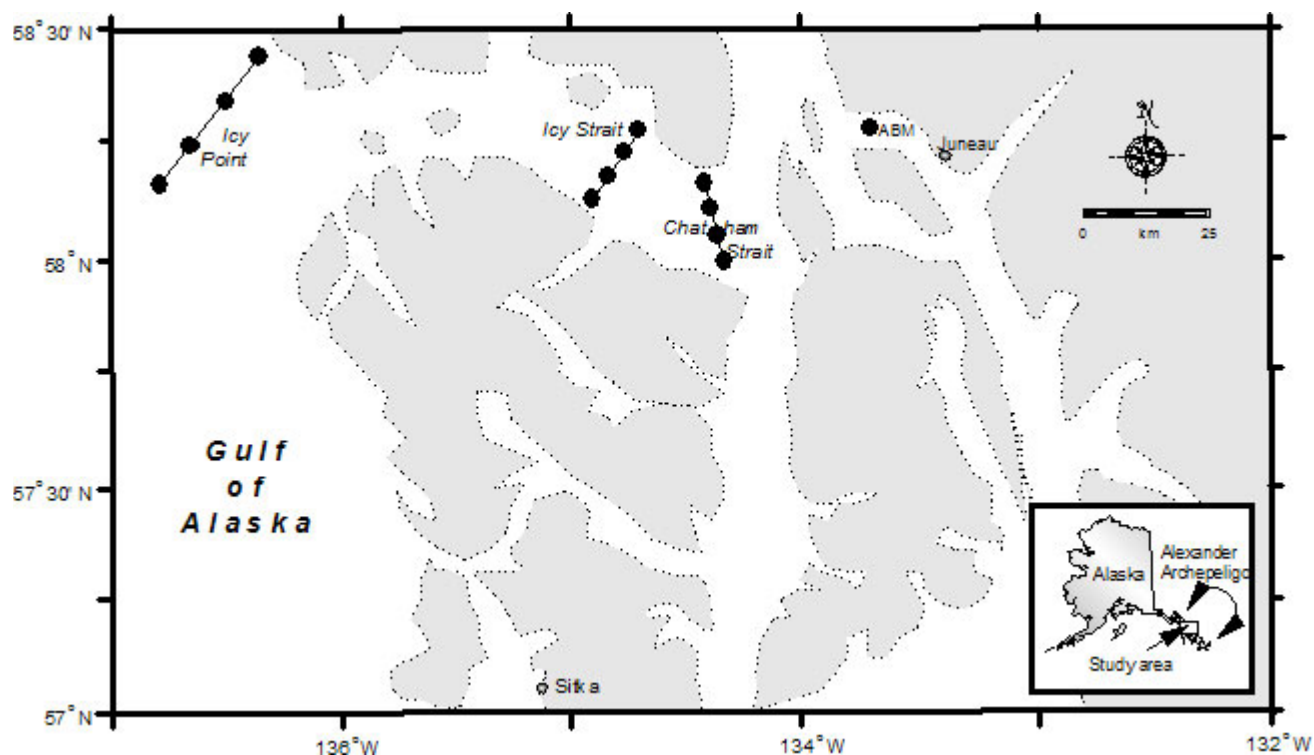
Table 1.—Localities and coordinates of stations sampled monthly in marine waters of the northern region of southeastern Alaska, May–August 2003.

Locality	Station	Latitude	Longitude	Offshore distance (km)	Bottom depth (m)
Auke Bay Monitor	ABM	58E 22.00NN	134E 40.00NW	1.5	60
Upper Chatham Strait	UCA	58E 04.57NN	135E 00.08NW	3.2	400
Upper Chatham Strait	UCB	58E 06.22NN	135E 00.91NW	6.4	100
Upper Chatham Strait	UCC	58E 07.95NN	135E 04.00NW	6.4	100

Upper Chatham Strait	UCD	58E 09.64NN	135E 02.52NW	3.2	200
Icy Strait	ISA	58E 13.25NN	135E 31.76NW	3.2	128
Icy Strait	ISB	58E 14.22NN	135E 29.26NW	6.4	200
Icy Strait	ISC	58E 15.28NN	135E 26.65NW	6.4	200
Icy Strait	ISD	58E 16.38NN	135E 23.98NW	3.2	234
Icy Point	IPA	58E 20.12NN	137E 07.16NW	6.9	160
Icy Point	IPB	58E 12.71NN	137E 16.96NW	23.4	130
Icy Point	IPC	58E 05.2NN	137E 26.75NW	40.2	150
Icy Point	IPD	57E 53.50NN	137E 42.60NW	65.0	1300

**Map Description:** Stations sampled monthly in marine waters of the northern region of southeastern Alaska, May–August 2003.

**Map:**





**Surface Nutrients Over the Shelf and Basin in Summer – Bottom up Control of Ecosystem Diversity**

**Related Park:** Alaska Region  
**Project Affiliations:** Gulf Ecosystem Monitoring  
**Website Address:** none given

**Primary Contact:**

Calvin W. Mordy  
 No address  
 Voice: none given fax: none given

**Principal Investigators:**

P.J. Stabeno  
 NOAA, Pacific Marine Environmental Laboratory  
 7600 Sand Point Way, NE  
 Seattle, WA 98115 United States  
 Voice: (206)526-6453 fax: none given  
 Phyllis.J.Stabeno@noaa.gov

**Hypotheses:**

To better understand the extraordinary variability of nutrients (spatial, interannual and decadal), and the factors controlling nearshore communities, and zooplankton and juvenile salmon distributions in the northern Gulf of Alaska, we propose monitoring nitrate over the shelf and basin. Underway samples will be collected as part of the GLOBEC salmon survey in July/August of 2003 and 2004. This survey includes a transit across the central GOA and 10 cross-shelf oceanographic and juvenile salmon transects from Yukatat to Kodiak Island. This will be the broadest nutrient survey of the northern GOA. Nutrient maps will be used to support NPZ models and satellite-derived models of nitrate and new production, to examine mechanisms of nutrient supply such as mixing over banks and transport up submarine canyons, and to assist resource management of salmon and other commercially important species. Funding in 2003 (\$38k) is vital as this is GLOBECs final intensive field season.

**Data Being Collected:**

Data being collected in 2003: Underway nitrate in conjunction with GLOBEC measurements of underway temperature, salinity, and fluorescence.

**Progress:** In work **West:** -155

**First Year Collected:** 2003

**Duration of Project:** 2004

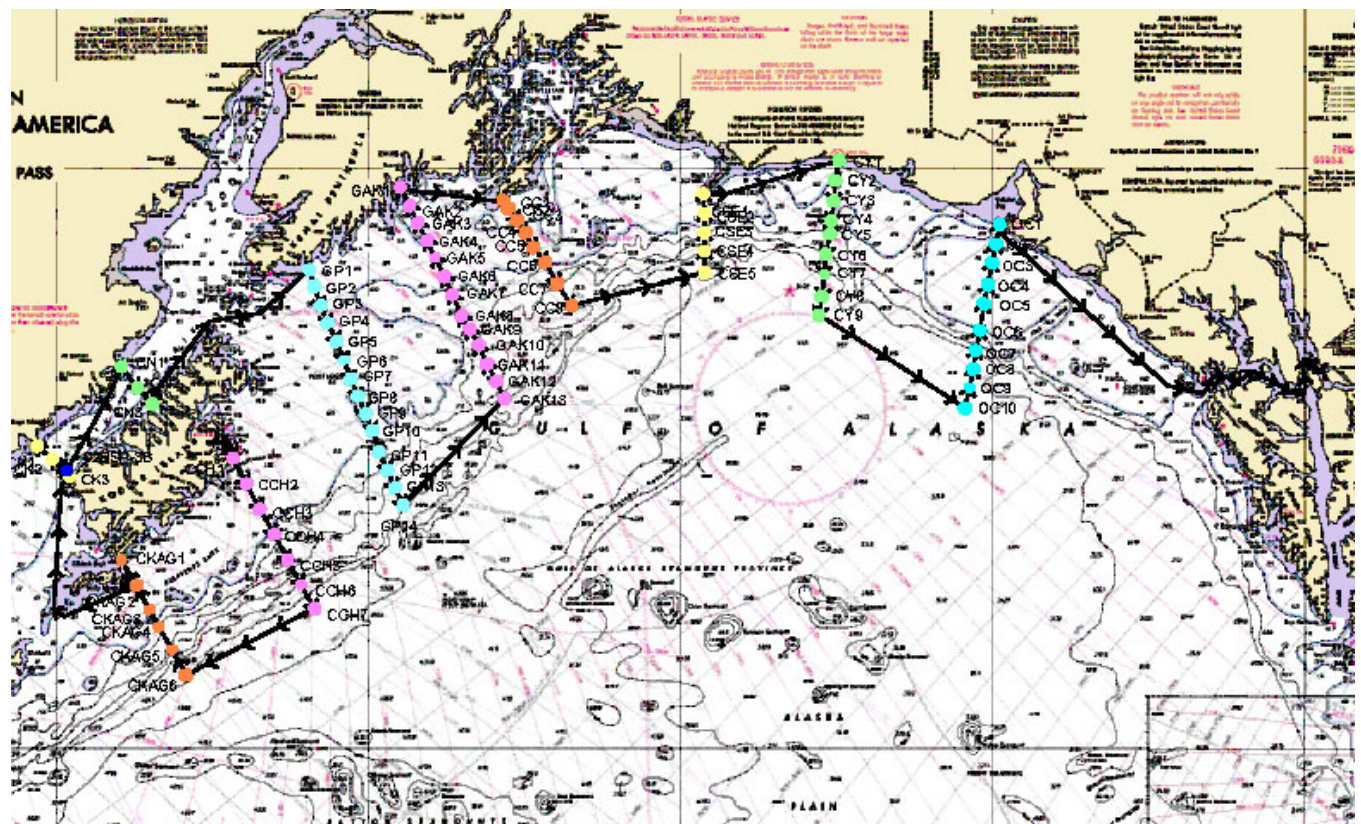
**Duration Descript:**

**East:** -134

**North:** 61

**South:** 55

**Map:**



**Utilization of Alaska kelp beds by commercially important fishes**

**Related Park:** Southwest Alaska Network  
**Project Affiliations:** University of Alaska Fairbanks, School of Fisheries and Ocean Science, Institute of Marine Science  
**Website Address:** none given

**Primary Contact:**

Judy Hamilton graduate student  
University of Alaska Fairbanks, School of Fisheries and Ocean  
Science, Institute of Marine Science  
Voice: (907)235-0677 fax: none given

**Principal Investigators:**

**Hypotheses:**

To investigate correlations between kelp and fish communities, and to consider seasonal and annual variation in such correlations.

**Data Being Collected:**

Data being collected in 2003: Monthly scuba surveys of fish and kelp.

**Progress:** In work  
**First Year Collected:** 2002  
**Duration of Project:** 2004  
**Duration Descript:** May 2002 – August 2003

**West:** -152  
**East:** -150.8  
**North:** 60  
**South:** 59.25

**Comments:**

Ten sites:

1. MacDonald Spit: UTM 5 579176E 6593916N;
2. Herring Islands: 583748E 6594353N;
3. Jakolof Bay entrance: 582930E 6593190N;
4. Inside Jakolof Bay: 583098E 6592875N
5. Little Jakolof Bay: 584302E 6593378N
6. Little Tutka Bay: 585826E 6593601N
7. Tutka Bay: 586862E 6595908N
8. Sadie Cove: 587258E 6596903N
9. Anisom Point: 587573E 6600408N
10. Hesketh Island: 583225E 6597279N.

**Map:** Seldovia C-5 SE.

### Factors affecting herbivores and predators along a vertical gradient in Kachemak Bay

**Related Park:** Southwest Alaska Network

**Project Affiliations:** University of Alaska Fairbanks, School of Fisheries and Ocean Science, Institute of Marine Science

**Website Address:** <http://www.sfos.uaf.edu>

**Primary Contact:**

Gayle Neufeld  
University of Alaska Fairbanks, School of Fisheries and Ocean  
Science, Institute of Marine Science  
Voice: none given fax: none given  
[gneufeld@sfos.uaf.edu](mailto:gneufeld@sfos.uaf.edu)

**Principal Investigators:**

**Hypotheses:**

The effect of grazing and predation varies along small-scale gradients within a single community.

Objectives:

- To determine the affect of tidal height and depth on herbivory and predation.
- To determine if herbivory and predation have an effect in structuring the intertidal and subtidal community at Outside Beach.
- To measure vertical environmental gradients of physical and chemical factors at Outside Beach.

**Data Being Collected:**

Data being collected in 2003: Pilot study, measure differences in herbivory/predation by exclusionary cages at different tidal heights and subtidal depths.

**Progress:** In work

**First Year Collected:**

**Duration of Project:**

**Duration Descript:** 2-3 years

**West:** -152

**East:** -150.75

**North:** 59.9

**South:** 59.3

## Biological, Marine Mammals

### Abundance and distribution of harbor seals (*Phoca vitulina*) in the Gulf of Alaska (including the south side of the Alaska Peninsula, Kodiak Island, Cook Inlet and Prince William Sound) during 2001

**Related Park:** Alaska Region  
**Project Affiliations:** Alaska Fisheries Science Center  
**Website Address:** <http://www.afsc.noaa.gov/>

**Primary Contact:**

David Withrow  
National Marine Mammal Laboratory  
Alaska Fisheries Science Center  
National Marine Fisheries Service, NOAA  
7600 Sand Point Way, NE  
Seattle, WA 98115 United States  
Voice: none given fax: none given

**Principal Investigators:**

John Bengtson  
National Marine Mammal Laboratory  
7600 Sand Point Way, NE  
Seattle, WA 98115 United States  
Voice: none given fax: none given

**Hypotheses:**

Minimum population estimates were obtained for harbor seals, *Phoca vitulina richardsi*, in the Gulf of Alaska region which runs from Unimak Pass in the west to Kayak Island (Cape Suckling) in the east, including the south side of the Alaska Peninsula and offshore islands, Kodiak Island, Cook Inlet, Kenai Peninsula and Prince William Sound. The study area was subdivided into 13 zones such that each section was surveyed by separate observers at about the same time. Zones 1 and 2 were flown from 12-20 August 2000 and Zones 3-13 were flown from 12-25 August 2001. A total of 590 haulout sites were identified. The mean number of seals counted was 24,428 with a 95% confidence interval between 23,265 and 25,591. The CV of the mean was equal to 2.4%.

**Data Being Collected:**

None in this area.

**Progress:** In work  
**First Year Collected:**  
**Duration of Project:**  
**Duration Descript:** Repeats every 5 years

**West:** -166  
**East:** -141  
**North:** 61  
**South:** 52

**Publications:**

Withrow, D., J.C. Cesarone, L. Hiruki-Raring and J.L. Bengtson. Abundance and distribution of harbor seals (*Phoca vitulina*) in the Gulf of Alaska (including the south side of the Alaska Peninsula, Kodiak Island, Cook Inlet and Prince William Sound) during 2001. National Marine Mammal Laboratory Alaska Fisheries Science Center National Marine Fisheries Service, NOAA

### Alaska Marine Mammal Tissue Archival Project (AMMTAP)

**Related Park:** Alaska Region

**Project Affiliations:** US Geological Survey, Alaska Science Center; National Oceanic and Atmospheric Administration; National Institute of Standards and Technology

**Website Address:** <http://www.absc.usgs.gov/research/ammtap/index.htm>

**Primary Contact:**

Geoff York  
US Geological Survey, Alaska Science Center  
1011 E. Tudor Road  
Anchorage, AK 99503 United States  
Voice: (907)786-3928 fax: none given  
[geoff\\_york@usgs.gov](mailto:geoff_york@usgs.gov)

**Principal Investigators:**

Teresa K Knowles  
National Oceanic and Atmospheric Administration  
PR2  
Silver Spring, MD 20910 United States  
Voice: (301)713-2322 fax: none given  
[Teri.Rowles@noaa.gov](mailto:Teri.Rowles@noaa.gov)

Dr. Paul R. Becker  
National Institute of Standards and Technology  
219 Fort Johnson Road  
Charleston, SC 29412-9110 United States  
Voice: (803)762-8503 fax: none given  
[Paul.Becker@noaa.gov](mailto:Paul.Becker@noaa.gov)

**Hypotheses:**

The objectives of AMMTAP are to collect tissue samples from Alaska marine mammals and to store these samples under the best conditions so that they can be analyzed in the future for environmental contaminants. The role of specimen banking in research and monitoring enables future investigators to extend their research into the past (hind casting) and provides for future verification of analytical results (quality assurance).

**Data Being Collected:**

Data being collected in 2003: Marine mammal tissue samples (liver, kidney, and blubber/fat) from subsistence harvested and recently stranded marine mammals across the state of Alaska (including harbour seal, sea otter, and sea lion).

**Progress:** In work

**West:** -169

**First Year Collected:**

**East:** -132

**Duration of Project:**

**North:** 72

**Duration Descript:** Into the foreseeable future

**South:** 51

**Publications:**

Becker, P.R. 1992. Marine mammal tissue bank: approach and techniques. Second Gulf Breeze Symposium; Dolphin Mortalities. December 1-3, 1992. Pensacola, Florida.

Becker, P.R. 1993. Alaska Marine Mammal Tissue Archival Project: Annual Report. Submitted to the U.S. Department of the Interior, Minerals Management Service. Interagency Agreement No. 17909. NMFS/PR, Silver Spring, Maryland. February 1993.

Becker, P.R. 1993. Characterization of the Arctic environment: marine biological resources. Plenary Session. Workshop on Arctic contamination, sponsored by the Interagency Arctic Research Policy Committee. May 2-7, 1993. Anchorage, Alaska

Becker, P.R. 1993. Studies of contaminants in Arctic marine mammals. Coastal Zone 93: Proceedings of the 8th Symposium on Coastal and Ocean Management (New Orleans, LA), O.T.

Magoon, W.S. Wilson, H. converse, & L.T. Tobin, eds., ASCE, New York, NY. 3: 2479-2493.

Becker, P.R. 1993. Studies of contaminants in Arctic marine mammals. Coastal Zone 93: Proceedings of the 8th Symposium on Coastal and Ocean Management (New Orleans, LA), O.T.

Magoon, W.S. Wilson, H. converse, & L.T. Tobin, eds., ASCE, New York, NY. 3: 2479-2493.

Becker, P.R. 1993. Studies of contaminants in Arctic marine mammals. Session 100: Strandings and Contaminants in Marine Mammals. Coastal Zone 93: Eighth Symposium on Coastal and Ocean Management. July 19-23, 1993. New Orleans, Louisiana.

- Becker, P.R. 1994. Alaska Marine Mammal Tissue Archival Project: Annual Report. Submitted to the U.S. Department of the Interior, Minerals Management Service. Interagency Agreement No. 17909. NMFS/PR, Silver Spring, Maryland. February 1994. 59 p.
- Becker, P.R. 1994. Alaska Marine Mammal Tissue Archival Project: Annual Report. Submitted to the U.S. Department of the Interior, Minerals Management Service. Interagency Agreement No. 17909. NMFS/PR, Silver Spring, Maryland. February 1994. 59 p.
- Becker, P.R. 1994. Alaska Marine Mammal Tissue Archival Project: Annual Report. Submitted to the U.S. Department of the Interior, Minerals Management Service. Interagency Agreement No. 17909. NMFS/PR, Silver Spring, Maryland. February 1994. 59 p.
- Becker, P.R. 1994. Alaska Marine Mammal Tissue Archival Project: Specimen Inventory. Submitted to the U.S. Department of the Interior, Minerals Management Service. Interagency Agreement No. 17909. NMFS/PR, Silver Spring, Maryland. February 1994. 41 p.
- Becker, P.R. 1994. Alaska Marine Mammal Tissue Archival Project: Specimen Inventory. Submitted to the U.S. Department of the Interior, Minerals Management Service. Interagency Agreement No. 17909. NMFS/PR, Silver Spring, Maryland. February 1994. 41 p.
- Becker, P.R. 1994. Alaska Marine Mammal Tissue Archival Project: Specimen Inventory. Submitted to the U.S. Department of the Interior, Minerals Management Service. Interagency Agreement No. 17909. NMFS/PR, Silver Spring, Maryland. February 1994. 41 p.
- Becker, P.R. 1995. Establishing baseline levels of elements in marine mammals through analysis of banked liver tissues. PACIFICHEM '95, International Chemical congress of Pacific Basin Societies. 17-22 December 1995. Honolulu, Hawaii, USA. 06-Envr, Symposium No. 531.
- Becker, P.R., & S.A. Wise. 1991. Marine mammal tissue archive. Special International session on Contaminants in the Arctic. 18th Annual Aquatic Toxicity Workshop. September 30-October 3, 1991. Ottawa, Canada.
- Becker, P.R., B.J. Koster, S.A. Wise, R. Zeisler. 1989. Alaskan Marine Mammal Tissue Archival Project. International conference on Nuclear Analytical Methods in the Life Sciences. April 17-21, 1989. Gaithersburg, Maryland.
- Becker, P.R., B.J. Koster, S.A. Wise, R. Zeisler. 1990. Alaskan Marine Mammal Tissue Archival Project. Biol. Trace Element Res. 26-27: 329-334.
- Becker, P.R., B.J. Koster, S.A. Wise, R. Zeisler. 1991. Biological specimen banking In Arctic research: an Alaska perspective. First International Symposium on Biological Environmental Specimen Banking. September 22-25, 1991. Vienna, Austria.
- Becker, P.R., B.J. Koster, S.A. Wise, T. Rowles, L. Thorsteinson. 1996. Specimen banking of marine organisms in the United States: Update of results and long-term prospective. 2nd International Symposium and Workshop on Biological Environmental Specimen Banking, BESB-2. May 20-23, 1996. Stockholm, Sweden.
- Becker, P.R., D. Wilkinson, & T.I. Lillestolen. 1994. Marine Mammal Health and Stranding Response Program: Program Development Plan. U.S. Dep. Commer., NOAA Tech. Memo. NMFS-OPR-94-2. Silver Spring, MD.
- Becker, P.R., D. Wilkinson, & T.I. Lillestolen. 1994. Marine Mammal Health and Stranding Response Program: Program Development Plan. U.S. Dep. Commer., NOAA Tech. Memo. NMFS-OPR-94-2. Silver Spring, MD.
- Becker, P.R., E.A. Mackey, M.M. Schantz, R. Demiralp, R.R. Greenberg, B.J. Koster, S.A. Wise, & D.C.G. Muir. 1995. Concentrations of Chlorinated Hydrocarbons, Heavy Metals and Other Elements in Tissues Banked by the Alaska Marine Mammal Tissue Archival Project. U.S. Dep. Commer., National Institute of Standards and Technology, NISTIR 5620. Gaithersburg, MD.
- Becker, P.R., E.A. Mackey, M.M. Schantz, R. Demiralp, R.R. Greenberg, B.J. Koster, S.A. Wise, & D.C.G. Muir. 1995. Concentrations of Chlorinated Hydrocarbons, Heavy Metals and Other Elements in Tissues Banked by the Alaska Marine Mammal Tissue Archival Project. U.S. Dep. Commer., National Institute of Standards and Technology, NISTIR 5620. Gaithersburg, MD.
- Becker, P.R., E.A. Mackey, R. Demiralp, B.J. Koster, & S.A. Wise. 1997. Establishing baseline levels of elements in marine mammals through analysis of banked liver tissues. In: Environmental Biomonitoring and Specimen Banking, K.S. Subramanian & G.V. Iyengar, eds., ACS Symposium Series 654. American Chemical Society Books, Washington, DC. 23: 261-270
- Becker, P.R., E.A. Mackey, R. Demiralp, M.M. Schantz, B.J. Koster, & S.A. Wise. 1997. Concentrations of chlorinated hydrocarbons and trace elements in marine mammal tissues archived in the U.S. National Biomonitoring Specimen Bank. Chemosphere. 34(9/10): 2067-2098.
- Becker, P.R., E.A. Mackey, R. Demiralp, R. Suydam, G. Early, B.J. Koster, & S.A. Wise. 1995. Relationship of silver with selenium and mercury in liver of two species of toothed whales (Odontocetes). Mar. Poll. Bull. 30(4): 262-271.
- Becker, P.R., E.A. Mackey, R. Demiralp, R. Suydam, G. Early, B.J. Koster, & S.A. Wise. 1995. Relationship of silver with selenium and mercury in liver of two species of toothed whales (Odontocetes). Mar. Poll. Bull. 30(4): 262-271.

- Becker, P.R., S.A. Wise, & R. Zeisler. 1988. Alaska Marine Mammal Tissue Archival Project: Acquisition and Curation of Alaska Marine Mammal Tissues for Determining the Levels of Contaminants Associated with Offshore Oil and Gas Development, OCSEAP Annual Report for RU 692. 43 p.
- Becker, P.R., S.A. Wise, & R. Zeisler. 1988. Alaska Marine Mammal Tissue Archival Project: Acquisition and Curation of Alaska Marine Mammal Tissues for Determining the Levels of Contaminants Associated with Offshore Oil and Gas Development, OCSEAP Annual Report for RU 692. 43 p.
- Becker, P.R., S.A. Wise, & R. Zeisler. 1988. Alaska Marine Mammal Tissue Archival Project: Acquisition and Curation of Alaska Marine Mammal Tissues for Determining the Levels of Contaminants Associated with Offshore Oil and Gas Development, OCSEAP Annual Report for RU 692. 43 p.
- Becker, P.R., S.A. Wise, & R. Zeisler. 1989. Alaska Marine Mammal Tissue Archival Project: Acquisition and Curation of Alaska Marine Mammal Tissues for Determining the Levels of Contaminants Associated with Offshore Oil and Gas Development, OCSEAP Annual Report for RU 692. 98 p.
- Becker, P.R., S.A. Wise, & R. Zeisler. 1989. Alaska Marine Mammal Tissue Archival Project: Acquisition and Curation of Alaska Marine Mammal Tissues for Determining the Levels of Contaminants Associated with Offshore Oil and Gas Development, OCSEAP Annual Report for RU 692. 98 p.
- Becker, P.R., S.A. Wise, & R. Zeisler. 1989. Alaska Marine Mammal Tissue Archival Project: Acquisition and Curation of Alaska Marine Mammal Tissues for Determining the Levels of Contaminants Associated with Offshore Oil and Gas Development, OCSEAP Annual Report for RU 692. 98 p.
- Becker, P.R., S.A. Wise, & R. Zeisler. 1990. Alaska Marine Mammal Tissue Archival Project: Acquisition and Curation of Alaska Marine Mammal Tissues for Determining the Levels of Contaminants Associated with Offshore Oil and Gas Development, OCSEAP Annual Report for RU 692. 89 p.
- Becker, P.R., S.A. Wise, & R. Zeisler. 1990. Alaska Marine Mammal Tissue Archival Project: Acquisition and Curation of Alaska Marine Mammal Tissues for Determining the Levels of Contaminants Associated with Offshore Oil and Gas Development, OCSEAP Annual Report for RU 692. 89 p.
- Becker, P.R., S.A. Wise, & R. Zeisler. 1990. Alaska Marine Mammal Tissue Archival Project: Acquisition and Curation of Alaska Marine Mammal Tissues for Determining the Levels of Contaminants Associated with Offshore Oil and Gas Development, OCSEAP Annual Report for RU 692. 89 p.
- Becker, P.R., S.A. Wise, & R. Zeisler. 1991. Alaska Marine Mammal Tissue Archival Project: Acquisition and Curation of Alaska Marine Mammal Tissues for Determining the Levels of Contaminants Associated with Offshore Oil and Gas Development, OCSEAP Annual Report for RU 692. 98 p.
- Becker, P.R., S.A. Wise, & R. Zeisler. 1991. Alaska Marine Mammal Tissue Archival Project: Acquisition and Curation of Alaska Marine Mammal Tissues for Determining the Levels of Contaminants Associated with Offshore Oil and Gas Development, OCSEAP Annual Report for RU 692. 98 p.
- Becker, P.R., S.A. Wise, B.J. Koster, R. Zeisler. 1988. Alaskan Marine Mammal Tissue Archival Project: A Description Including Collection Protocols. U.S. Dep. Commer., National Bureau of Standards, NBSIR 88-3750. Gaithersburg, Maryland.
- Becker, P.R., S.A. Wise, B.J. Koster, R. Zeisler. 1991. Alaska Marine Mammal Tissue Archival Project: Revised Collection Protocol. U.S. Dep. Commer., National Institute of Standards and Technology, NISTIR 4529. Gaithersburg, MD.
- Becker, P.R., S.A. Wise, L. Thorsteinson, B.J. Koster, & T. Rowles. 1997. Specimen banking of marine organisms in the United States: current status and long-term prospective. *Chemosphere*. 34(9/10): 1889-1906.
- Becker, P.R., S.A. Wise, M.M. Schantz, B.J. Koster, R. Zeisler. 1992. Alaska Marine Mammal Tissue Archival Project: Sample Inventory and Results of Analyses of Selected Samples for Organic Compounds and Trace Elements. U.S. Dep. Commer., National Institute of Standards and Technology, NISTIR 4731. Gaithersburg, MD.
- Hameedi, M.J. 1990. The Alaska Marine Mammal Tissue Archival Project. *Arctic Research of the United States* 26-30.
- Koster, B.J., S.A. Wise, & P.R. Becker. 1994. Alaska Marine Mammal Tissue Archival Project: Specimen Inventory. U.S. Dep. Commer., National Institute of Standards and Technology, NISTIR 5462. Gaithersburg, MD.
- Koster, B.J., S.A. Wise, & P.R. Becker. 1994. Alaska Marine Mammal Tissue Archival Project: Specimen Inventory. U.S. Dep. Commer., National Institute of Standards and Technology, NISTIR 5462. Gaithersburg, MD.



- Krahn, M.M., P.R. Becker, K.L. Tilbury, & J.E. Stein. 1997. Organochlorine contaminants in blubber of four seal species: integrating biomonitoring and specimen banking. *Chemosphere*. 34(9/10): 2109-2121
- Lillestolen, T.I., N. Foster, S.A. Wise. 1993. Development of the National Marine Mammal Tissue Bank. *Sci. Total Environ.* 239/140: 97-107.
- Lillestolen, T.I., P.R. Becker, D. Wilkinson. 1993. The National Marine Mammal Tissue Bank and Stranding Network Program. *Coastal Zone 93: Proceedings of the 8th Symposium on Coastal and Ocean Management* (New Orleans, LA), O.T. Magoon, W.S. Wilson, H. converse, & L.T. Tobin, eds., ASCE, New York, NY. 3: 2494-2504.
- Mackey, E.A., P.R. Becker, R. Demiralp, R.R. Greenberg, B.J. Koster, & S.A. Wise. 1996. Bioaccumulation of vanadium and other trace elements in livers of Alaskan cetaceans and pinnipeds. *Arch. Environ. Contam. Toxicol.* 30: 503-512.
- Mackey, E.A., R. Demiralp, P.R. Becker, R.R. Greenberg, B.J. Koster, & S.A. Wise. 1995. Trace element concentrations in cetacean liver tissues archived in the National Marine Mammal Tissue Bank. *Sci. Total Environ.* 175:25-41.
- Mackey, E.A., R. Demiralp, P.R. Becker, R.R. Greenberg, B.J. Koster, & S.A. Wise. 1995. Trace element concentrations in cetacean liver tissues archived in the National Marine Mammal Tissue Bank. *Sci. Total Environ.* 175:25-41.
- Mössner, S., I. Barudio, T.S. Spraker, G. Antonelis, G. Early, J.R. Geraci, P.R. Becker, & K. Ballschmiter. 1994. Determination of HCHs, PCBs, and DDTs in brain tissues of marine mammals of different age. *Fresenius J. Anal. Chem.* 349: 708-716.
- Mössner, S., I. Barudio, T.S. Spraker, G. Antonelis, G. Early, J.R. Geraci, P.R. Becker, & K. Ballschmiter. 1994. Determination of HCHs, PCBs, and DDTs in brain tissues of marine mammals of different age. *Fresenius J. Anal. Chem.* 349: 708-716.
- Mössner, S., T.R. Spraker, P.R. Becker, K. Ballschmiter. 1992. Ratios of enantiomers of alpha-HCH and determination of alpha-, beta- and gamma-HCH isomers in brain and other tissues of neonatal northern fur seals (*Callorhinus ursinus*). *Chemosphere* 24(9): 1171-1180.
- Ponce, R.A., G.M. Egeland, John P. Middaugh, & P.R. Becker. 1997. Twenty years of trace metal analyses of marine mammals: Evaluation and summation of data from Alaska and other Arctic regions. *State of Alaska Epidemiology Bulletin* Vol. 1, No. 3, 15 p.
- Schantz, M.M., B.J. Koster, R. Zeisler, S.A. Wise, P.R. Becker. 1993. Determination of PCBs and chlorinated hydrocarbons in marine mammal tissues. *Sci. Total Environ.* 139/140: 323-345.
- Schantz, M.M., B.J. Koster, R. Zeisler, S.A. Wise, P.R. Becker. 1993. Determination of PCBs and chlorinated hydrocarbons in marine mammal tissues. *Sci. Total Environ.* 139/140: 323-345.
- Schantz, M.M., B.J. Koster, S.A. Wise, M. Segstro, D.C.G. Muir, S. Mössner, K. Ballschmiter, & P.R. Becker. 1996. Interlaboratory comparison study for PCB congeners and chlorinated pesticides in beluga whale blubber. *Chemosphere* 33: 1369-1390.
- Stone, S. F., & R. Zeisler. 1992. Nuclear Analytical Methods in Environmental Specimen Banking. In: *Analytical Approaches as Related to Specimen Banking*, M. Rossbach, P. Ostapczuk, and J. D. Schladot, eds., Springer Verlag, Stuttgart, Germany, 139-152.
- Wise, S. A. & B.J. Koster. 1995. Considerations in the Design of an Environmental Specimen Bank: Experiences of the National Biomonitoring Specimen Bank Program. *Environ. Health Perspect.* 103 (Suppl. 3): 61-67.
- Wise, S.A. 1993. Quality assurance of contaminant measurements in marine mammal tissues. *Coastal Zone 93: Proceedings of the 8th Symposium on Coastal and Ocean Management* (New Orleans, LA), O.T. Magoon, W.S.
- Wilson, H. converse, & L.T. Tobin, eds., ASCE, New York, NY. 3: 2531-2541.
- Wise, S.A. 1993. Quality assurance of contaminant measurements in marine mammal tissues. *Coastal Zone 93: Proceedings of the 8th Symposium on Coastal and Ocean Management* (New Orleans, LA), O.T. Magoon, W.S. Wilson, H. converse, & L.T. Tobin, eds., ASCE, New York, NY. 3: 2531-2541.
- Wise, S.A., B.J. Koster, J.L. Langland, & R. Zeisler. 1993. Current activities within the National Biomonitoring Specimen Bank. *Sci. Total Environ.* 139/140:1-12.
- Wise, S.A., B.J. Koster, J.L. Langland, & R. Zeisler. 1993. Current activities within the National Biomonitoring Specimen Bank. *Sci. Total Environ.* 139/140:1-12.
- Wise, S.A., B.J. Koster, J.L. Langland, & R. Zeisler. 1993. Current activities within the National Biomonitoring Specimen Bank. *Sci. Total Environ.* 139/140:1-12.

- Wise, S.A., B.J. Koster, R. Zeisler. 1988. Status of specimen banking at National Bureau of Standards. In: Progress in Environmental Specimen Banking. National Bureau of Standards Spec. Pub. 740. Wise, S.A., R. Zeisler, G.M. Goldstein, eds., Gaithersburg, Maryland. 10-18.
- Wise, S.A., B.J. Koster, R.M. Parris, M.M. Schantz, S.F. Stone, R. Zeisler. 1989. Experiences in environmental specimen banking. Int. J. Environ. Anal. Chem. 37:91-106.
- Wise, S.A., R. Zeisler, G.M. Goldstein, Editors. 1988. Progress in Environmental Specimen Banking. National Bureau of Standards Spec. Pub. 740. U.S. Government Printing Office, Washington, D.C. Gaithersburg, Maryland. 202 pp.
- York, Geoffrey, P. Becker, and L. Thorsteinson. 1999. Alaska Marine Mammal Tissue Archival Project. Focus on the Future - Alaska Environmental Studies, 7th Alaska OCS Region, Minerals Management Service Information Transfer Meeting. Anchorage, AK
- Zeisler, R., B.J. Koster, S.A. Wise. 1992. Specimen banking at the National Institute of Standards and Technology. In: Analytical Approaches as Related to Specimen Banking. Rossbach, M., & J.D. Schladow, eds., Stuttgart: Springer Verlag, 37-49.
- Zeisler, R., R. Demiralp, B.J. Koster, P.R. Becker, M. Burow, P. Ostapczuk, & S.A. Wise. 1993. Determination of inorganic constituents in marine mammal tissues. Sci. Total Environ. 139/140: 365-386
- Zeisler, R., R. Demiralp, B.J. Koster, P.R. Becker, M. Burow, P. Ostapczuk, & S.A. Wise. 1993. Determination of inorganic constituents in marine mammal tissues. Sci. Total Environ. 139/140: 365-386

### Gulf of Alaska cetacean survey

**Related Park:** Alaska Region  
**Project Affiliations:** National Marine Fisheries Service; National Oceanic and Atmospheric Administration  
**Website Address:** <http://nmml.afsc.noaa.gov/>

#### Primary Contact:

Janice Waite  
National Marine Mammal Laboratory  
7600 Sand Point Way, NE  
Seattle, WA 98115 United States  
Voice: (206)526-4021 fax: none given  
Sue.Moore@noaa.gov

#### Principal Investigators:

Sue Moore  
National Marine Mammal Laboratory  
Alaska Fisheries Science Center  
Seattle, WA 98115 United States  
Voice: (206)526-4021 fax: none given  
Sue.Moore@noaa.gov

#### Hypotheses:

Commercial harvests of baleen whales were extensive in the North Pacific and Bering Sea, especially between 1835 and 1850 for North Pacific right whales and between 1965 and 1979 for fin and humpback whales. The effect of these large-scale removals on the marine ecosystem is largely unknown. Similarly, some species of toothed whales (odontocetes) are sometimes killed in the course of commercial fishing operations. Pelagic dolphins and Dall's porpoise were especially vulnerable during high seas driftnet fishing in the North Pacific in the 1980s, with the long-term ramifications of these removals also unknown. One reason for this uncertainty is the lack of data on current cetacean distribution and estimates of abundance in pelagic environments. Surveys to determine distribution and abundance are costly and therefore often confined to coastal waters where the logistics are most practical, or to areas of the ocean where marine mammal mortality associated with commercial fishing is particularly high. The pelagic waters of the Gulf of Alaska have not met either criteria and so are comparatively under-sampled for cetaceans. In addition to the line-transect survey, the opportunity to collect identification photographs and biopsy samples of different cetacean species is highly valuable. For species such as North Pacific right whales, killer whales and humpback whales, there are currently studies using photographs for abundance estimation, and genetic information from biopsies to help define stock structure. Additional photographs and biopsy samples, especially from areas that are not routinely surveyed, greatly contribute to these studies. In 1997, 1999, 2000, and 2002, The National Marine Mammal Laboratory (NMML) placed marine mammal observers on the NOAA ship Miller Freeman during the Alaska Fisheries Science Center Midwater Assessment and Conservation Engineering=s acoustic-trawl survey to conduct a line-transect survey while the ship surveyed between trawling sites. During those years, the acoustic survey was conducted on the Bering Sea shelf. The cetacean surveys were invaluable for updating information on cetacean distribution and abundance in that area. Photographs and genetic samples collected also contributed a great deal of information for mark-recapture studies and stock identification. The Miller Freeman 2003 acoustic survey is in the Gulf of Alaska. Leg 2, on the shelf east of Kodiak Island, will be in a region that has not been well surveyed for marine mammals and provides a great opportunity to collect information on distribution and abundance of cetaceans in that area.

#### Data Being Collected:

NMML will conduct a marine mammal line-transect survey along transect lines during Leg 2 of the Miller Freeman trawl survey, and collect photographic and biopsy data, on a not-to-interfere basis with the acoustic trawl survey. Species of interest would include killer whales, humpback whales, fin whales and right whales. Other species could be targeted if the opportunity arises.

<b><u>Progress:</u></b>	Complete	<b><u>West:</u></b>	-161.25
<b><u>First Year Collected:</u></b>	2003	<b><u>East:</u></b>	-147
<b><u>Duration of Project:</u></b>	2003	<b><u>North:</u></b>	60.5
<b><u>Duration Descript:</u></b>	26 June – 16 July, 2003	<b><u>South:</u></b>	54

#### Publications:

- Moore, S. E., J. M. Waite, L. L. Mazzuca and R. C. Hobbs. 2000. Mysticete whale abundance and observations of prey associations on the central Bering Sea shelf. *Journal of Cetacean Research and Management* 2(3): 227-234.
- Moore, S. E., J. M. Waite, N. A. Friday and T. Honkalehto. 2002. Cetacean distribution and relative abundance on the central-eastern and southeastern Bering Sea shelf with reference to oceanographic domains. *Progress in Oceanography* 55(1-2) 249-261.
- Waite, J. M., N. A. Friday and S. E. Moore. 2002. Killer whale (*Orcinus orca*) distribution and abundance in the central and southeastern Bering Sea, July 1999 and June 2000. *Marine Mammal Science* 18:779-786.
- Waite, J. M., N. Friday and S. E. Moore. 2001. Cetacean vessel survey in the southeastern Bering Sea, June 2000. Document SC/53/O7

presented to the IWC Scientific Committee, July 2001 (unpublished). 15 pp.

Waite, J. M., N. Friday and S. E. Moore. 2001. Cetacean vessel surveys in the southeastern Bering Sea, June 2000. Marine Mammal Protection Act and Endangered Species Act implementation program 2000. A. L. Lopez and R. P. Angliss. Seattle, WA, U.S. Department of Commerce: 27-44.

Waite, J. M., S. Norman, D. Kinzey and S. Moore. 2002. Eastern Bering Sea cetacean line-transect survey aboard the NOAA ship Miller Freeman, June and July 2002. Cruise report.

Waite, J. M., S. Norman, D. Kinzey and S. Moore. 2002. Eastern Bering Sea cetacean line-transect survey aboard the NOAA ship Miller Freeman, June and July 2002. Cruise report.

**Map Description:**

The research area will include the eastern part (Leg 2) of the map below, probably including Shelikof Strait and the shelf east of Kodiak Island to Prince William Sound.

**Map:**

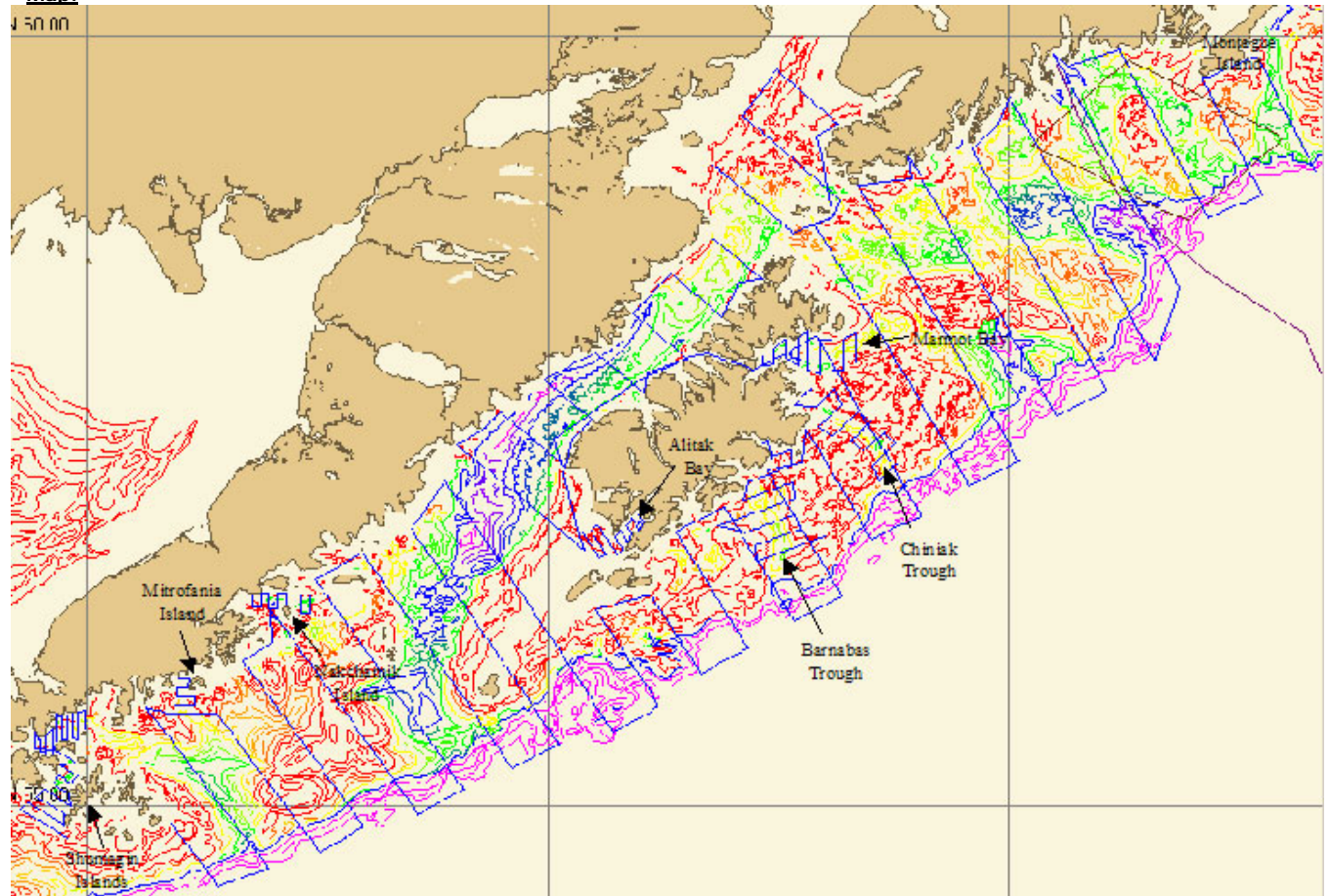


Figure 1. Proposed trackline for the 2003 summer echo integration-trawl survey of the Gulf of Alaska.

**Investigations of harbor seals in Alaska**

**Related Park:** Alaska Region  
**Project Affiliations:** Alaska Fish and Game, Division of Wildlife Conservation  
**Website Address:** <http://www.state.ak.us/adfg/wildlife/wildmain.htm>

**Primary Contact:**

Gail Blundell  
Alaska Fish and Game, Division of Wildlife Conservation  
P.O. Box 240020  
Douglas, AK 99824-0020 United States  
Voice: (907)465-4345 fax: none given

**Principal Investigators:**

**Hypotheses:**

Monitor trends in harbor seal populations statewide, design/conduct research to determine why some populations of harbor seals are declining in Alaska, vital rates research, foraging behavior. Multiple projects -- statewide research program.

**Data Being Collected:**

Year 2003: Time Depth Recorders (TDR), long-term (5 yr) VHF implants for vital rates study, seal condition, diet data, photo ID study, foraging under predation risk (sonic tags and prey assessment)

**Data Collected in the past 2 years:**

Time Depth Recorders (TDR), long-term (5 yr) VHF implants for vital rates study, seal condition, diet data, photo ID study, foraging under predation risk (sonic tags and prey assessment)

**Progress:** In work

**West:** -180

**First Year Collected:**

**East:** -128

**Duration of Project:** 2008

**North:** 72

**Duration Descript:** expected end date 2008

**South:** 53

**Publications:**

see website

**Comments:**

Kodiak TDR deployment ends July 2003, VHF vital rates study in PWS 5 years (ends 2008?), PWS foraging study ends 2004.

### Sea Otters and Coastal Ecosystems

**Related Park:** Alaska Region  
**Project Affiliations:** US Geological Survey, Alaska Science Center  
**Website Address:** [http://www.absc.usgs.gov/research/sea\\_otters/index.htm](http://www.absc.usgs.gov/research/sea_otters/index.htm)

**Primary Contact:**

James Bodkin  
US Geological Survey, Alaska Science Center  
1011 E. Tudor Road  
Anchorage, AK 99503 United States  
Voice: (907)786-3550 fax: none given  
James\_Bodkin@USGS.gov

**Principal Investigators:**

**Hypotheses:**

Nearshore marine communities support a wide array of commercially, recreational and culturally valuable resources. Taxa include, but are not limited to, algae, invertebrates, fish, birds and mammals. A broad array of processes are responsible in structuring nearshore marine communities including both physical factors (e.g., temperature, salinity, currents) and biological factors (e.g., reproduction, growth, succession, competition, and predation). Human induced impacts in the coastal regions of Alaska are inevitable and increasing in scale and magnitude. In order to understand, quantify and attribute cause to changes in the nearshore ecosystem it is imperative to understand primary sources of community structuring and of natural or background levels of variation in the system. The sea otter, once nearly extinct, is currently reoccupying previous habitat in much of the North Pacific. The process of recolonization provides a unique opportunity to apply the experimental approach to describing the effects of a large mammalian predator on its prey and subsequent community organization. The role of sea otters in structuring nearshore marine communities in the north Pacific Ocean are recognized as significant, particularly among exposed rocky shorelines. Much less is known of the effects of sea otter reintroduction into soft sediment habitats. It is now possible to examine effects of sea otter foraging as they begin to recolonize Glacier Bay National Park and Preserve in southeast Alaska, a predominately soft sediment marine community. Information on the distribution and abundance of sea otters in and around Glacier Bay will provide the description of the spatial and temporal process of sea otter recolonization and provide the basis for study sites to evaluate changes in community structure before and after the effects of sea otters. Study of sea otter food habits will provide a measure of the direct effects of prey removal. Study of sea otter diving behavior will provide a measure of the bathymetric extent of sea otters in structuring communities. Study of prey populations will allow documentation of changes in abundance and size distributions resulting from sea otter foraging.

**Data Being Collected:**

Data being collected in 2003: We conduct a diverse array of research on coastal marine ecosystems, focusing on the role of sea otters on structuring communities and the effects of changing marine communities on sea otter populations. Data includes, but may not be limited to: distribution, abundance, density, age/sex composition, survival, fecundity, reproduction, behavior, physiology, morphology, diet, energetics, diving. We also conduct study of marine community species composition, density, and age/size class distributions, focusing on marine algae, benthic invertebrates, fishes, birds and other marine mammals

**Progress:** In work

**First Year Collected:**

**Duration of Project:**

**Duration Descript:** Indefinite

**West:** -169

**East:** -141

**North:** 61

**South:** 50

**Publications:**

- Adkison, M.D., B. Ballachey, J. Bodkin, and L. Holland-Bartels. 1998. Integrating ecosystem studies: a Bayesian comparison of hypotheses. In: F. Funk, J.N. Ianelli, T.J. Quinn II, and P.J. Sullivan (eds.) Proceedings of the international symposium on fishery stock assessment models for the 21st century. Alaska Sea Grant College Program.
- Ballachey, B. E, J.J. Stegeman, P.W. Snyder, G.M. Blundell, J.L. Bodkin, T. A. Dean, L. Duffy, D. Esler, G. Golet, S. C. Jewett, L. Holland-Bartels, A.H. Rebar, P.A Siser and K.A. Trust. Oil exposure and health of nearshore vertebrate predators in Prince William Sound following the Exxon Valdez oil spill. Pages 2.1-2.57 in L. E. Holland-Bartels, editor (2000). Mechanisms of impact and potential recovery of nearshore vertebrate predators following the 1989 Exxon Valdez oil spill. Exxon Valdez Oil Spill Trustee Council Restoration Project Final Report (Restoration Project 95025-99025), U.S. Geological Survey, Alaska Biological Science Center, Anchorage, Alaska, USA.
- Ballachey, B.E., J.L. Bodkin and A.R. DeGange. 1994. An overview of sea otter studies. in T. Loughlin editor. Marine mammals and the Exxon Valdez. Academic Press. San Diego, CA pages 47-59.

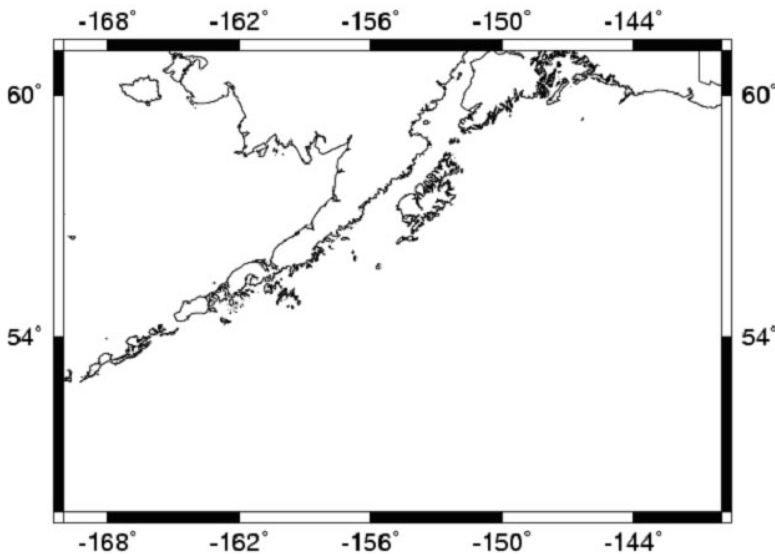
- Ballachey, B.E., J.L. Bodkin, S. Howlin, A.M. Doroff, and A.H. Rebar. In press. Correlates to survival of juvenile sea otters in Prince William Sound, Alaska. *Canadian J. Zoology*.
- Baskaran, M., G. -H. Hong, S. Dayton, J.L. Bodkin, and J.J. Kelly. 2002. Temporal variation of natural and anthropogenic radionuclides in sea otter skull tissue in the North Pacific Ocean. *J. Env. Radioactivity* 64:1-18.
- Bodkin, J.L. 1986. Fish assemblages in *Macrocystis* and *Nereocystis* kelp forests off central California. *U.S. Fishery Bulletin*. 84(4):799-808.
- Bodkin, J.L. 1988. Effects of kelp forest removal on associated fish assemblages in central California. *Journal of Experimental Marine Biology and Ecology*. 117:227-238.
- Bodkin, J.L. and F. Weltz. 1990. A summary and evaluation of sea otter rescue operations in response to the Exxon Valdez oil spill, Prince William Sound, Alaska, 1989. *Proceedings; Sea Otter Symposium, Anchorage, Alaska, 17-19 April, 1990*. pp 61-69.
- Bodkin, J.L., G.R. VanBlaricom and R.J. Jameson. 1987. Mass mortalities of nearshore fishes following period of large, long period storm swells. *Environmental Biology of Fishes*. 18(1):73-76.
- Bodkin, J. L. and D. H. Monson. 1999. Sea otter distribution and relative abundance; Cross Sound-Icy Strait Survey Summary. *Annual Report to Glacier Bay National Park and Preserve*.
- Bodkin, J. L. and M.S. Udevitz. 1999. An aerial survey method to estimate sea otter abundance. in: Garner, G.W., S.C. Amstrup, J.L. Laake, B.F.J. Manly, L.L. McDonald, and D.G. Robertson, (eds.) *Marine mammal survey and assessment methods*. Balkema Press, Netherlands pg. 13-26.
- Bodkin, J. L., B. E. Ballachey, T. A. Dean, A. K. Fukuyama, S. C. Jewett, L. McDonald, D. H. Monson, C. E. O'Clair, and G. R. VanBlaricom. 2000. Sea otter (*Enhydra lutris*) perspective: Mechanisms of impact and potential recovery of nearshore vertebrate predators following the 1989 Exxon Valdez oil spill. Part A. Sea otter population recovery. Pages 3A.1? 3A.28 in
- Bodkin, J.L. 2000. Sea otters past and present perspectives. *Alaska Geographic*. 7(2): 73-93.
- Bodkin, J.L. and L. Browne. 1992. Molt frequency and size-class distribution in the spiny lobster (*Panulirus interruptus*), at San Nicolas Island, California. *California Fish and Game*. 78(4):136-144.
- Bodkin, J.L. and R. Jameson. 1991. Patterns of seabird and marine mammal carcass deposition along the central California coast, 1980-1986. *Can J. Zool*. 69:1149-1155.
- Bodkin, J.L. In press. Sea Otter Foraging and Implications to Shellfish Aquaculture. *Proceedings: Exploring On-Bottom Shellfish Aquaculture for Alaska. A conference and workshop to present information and explore on-bottom shellfish mariculture for Alaska. November 13-14, 2001, Anchorage, Alaska. University of Alaska, Marine Advisory Program*.
- Bodkin, J.L. K. A. Kloecker, G.G. Esslinger, D. H. Monson, J. D. DeGroot and J. Doherty. 2002. Sea Otter Studies in Glacier Bay National Park and Preserve. *Annual Report 2001. USGS Alaska Science Center, Anchorage AK*.
- Bodkin, J.L. K. A. Kloecker, H.A. Coletti, G.G. Esslinger, D. H. Monson, and B.E. Ballachey. 2002. Marine predator surveys in Glacier Bay National Park and Preserve. *Annual Report 2001. USGS Alaska Biological Science Center, Anchorage AK*.
- Bodkin, J.L. K. A. Kloecker, H.A. Coletti, G.G. Esslinger, D. H. Monson, and B.E. Ballachey. 2002. Marine predator surveys in Glacier Bay National Park and Preserve. *Annual Report 2001. USGS Alaska Biological Science Center, Anchorage AK*.
- Bodkin, J.L. 2001. Marine Mammals: Sea otters. Pages 2614-2621. in Steele, J. S. Thorpe and K. Turekian (eds.) *Encyclopedia of Ocean Sciences*. Academic Press, London UK. (invited ms)
- Bodkin, J.L. and B.E. Ballachey. 1996. Monitoring the status of the wild sea otter population: field studies and techniques. *Endangered Species Update. University of Michigan Vol 13(12): 14-20*.
- Bodkin, J.L. and B.E. Ballachey. 1997. *Restoration Notebook Series: Sea Otter (Enhydra lutris) Exxon Valdez Oil Spill Trustee Council. Anchorage, AK*.
- Bodkin, J.L. and D.H. Monson. Submitted. Sea otter population structure and ecology in Alaska. *Arctic Research*. Bodkin, J.L. and K.A. Kloecker. 1999. Intertidal clam diversity, size, abundance and biomass in Glacier Bay National Park and Preserve. *Annual Report to Glacier Bay National Park and Preserve*.
- Bodkin, J.L. and K.W. Kenyon. in press. Sea Otter. Pages 00-00, in Feldham, G. A and B. Thompson (eds), *Wild Mammals of North America*, 2nd edition. Johns Hopkins University Press. (invited ms).

- Bodkin, J.L. and M.S. Udevitz. 1994. Intersection model for estimating sea otter mortality along the Kenai Peninsula. in T. Loughlin editor. *Marine mammals and the Exxon Valdez*. Academic Press. San Diego, CA pages 81-95.
- Bodkin, J.L. K. A. Kloecker, G.G. Esslinger, D. H. Monson, H.A. Coletti and J. Doherty. 2003. *Sea Otter Studies in Glacier Bay National Park and Preserve. Annual Report 2002*. USGS Alaska Science Center, Anchorage AK.
- Bodkin, J.L., A.M. Burdin and D.A. Ryzanov. 2000. Age and sex specific mortality and population structure in sea otters. *Marine Mammal Science* 16(1): 201-219.
- Bodkin, J.L., B.E. Ballachey, M.A. Cronin and K.T. Scribner. 1999. Population demographics and genetic diversity in remnant and re-established populations of sea otters. *Conservation Biology* 13(6): 1278-1385.
- Bodkin, J.L., B.E. Ballachey, T.A. Dean, A.K. Fukuyama, S.C. Jewett, L.M. McDonald, D.H. Monson, C.E. O'Clair and G.R. VanBlaricom. 2002. Sea otter population status and the process of recovery from the Exxon Valdez oil spill. *Marine Ecology Progress Series*. 241:237-253.
- Bodkin, J.L., G.G. Esslinger, and D.H. Monson. 1999. Estimated sea otter population size in Glacier Bay. *Annual Report to Glacier Bay National Park and Preserve*.
- Bodkin, J.L., J.A. Ames, R.J. Jameson, A.M. Johnson and G.M. Matson. 1997. Accuracy and precision in estimating age of sea otters using cementum layers in the first premolar. *J. Wildlife Management* 61(3): 967-973.
- Bodkin, J.L., R.J. Jameson and J. A. Estes. 1994. Sea otters in the North Pacific Ocean. In E.T. LaRoe III, G.S. Farris, C.E. Puckett and P.D. Doran, editors. *Our Living Resources 1994: A report to the nation on the distribution, abundance and health of U.S. plants, animals and ecosystems*. National Biological Service. Washington D.C. pages 353-356.
- Cronin, M.A., J.L. Bodkin, B.E. Ballachey, J.A. Estes, and J.C. Patton. 1996. Mitochondrial DNA variation among subspecies and populations of sea otters (*Enhydra lutris*). *J. Mammalogy*. 77(2): 547-557.
- Dean, T.A. J.L. Bodkin, A. K. Fukuyama, S. C. Jewett, D. H. Monson, C. E. O'Clair, and G. R. VanBlaricom. 2000. Sea otter (*Enhydra lutris*) perspective: Mechanisms of impact and potential recovery of nearshore vertebrate predators following the 1989 Exxon Valdez oil spill. Part B. Food limitation and the recovery of sea otters in Prince William Sound. Pages 3B.1? 3B.41 in L. E. Holland-Bartels, editor (2000). *Mechanisms of impact and potential recovery of nearshore vertebrate predators following the 1989 Exxon Valdez oil spill*. Exxon Valdez Oil Spill Trustee Council Restoration Project Final Report (Restoration Project 95025-99025), U.S. Geological Survey, Alaska Biological Science Center, Anchorage, Alaska, USA.
- Dean, T.A., J.L. Bodkin, S.C. Jewett, D.H. Monson and D. Jung. 2000. Changes in sea urchins and kelp following a reduction in sea otter density as a result of the Exxon Valdez oil spill. *Marine Ecology Progress Series*. 199:281-291.
- Dean, T.A., J.L. Bodkin, A.K. Fukuyama, S.C. Jewett, D.H. Monson, C.E. O'Clair, and G.R. VanBlaricom. 2002. Food limitation and the recovery of sea otters in Prince William Sound. *Marine Ecology Progress Series*. 241:255-270
- Doroff, A.M. and J.L. Bodkin. 1994. Sea otter foraging behavior and hydrocarbon levels in prey. in T. Loughlin, editor. *Marine mammals and the Exxon Valdez*. Academic Press. San Diego, CA pages 193-208.
- Estes, J.A. and J.L. Bodkin. 2002. Marine Otters. In W.F. Perrin, B. Wursig, J.G.M. Thewissen and C.R. Crumly (eds) *Encyclopedia of Marine Mammals*. Academic Press 843-858. (invited ms).
- Estes, J.A., D.F. Doak, J.L. Bodkin, R.J. Jameson, D. Monson, J. Watt and T. Tinker. 1996. Comparative demography of sea otter populations. *Endangered Species Update*. University of Michigan Vol.13 (12): 11-13.
- Gorbics, C and J.L. Bodkin. 2001. Stock Identity of sea otters in Alaska. *Marine Mammal Science* 17(3): 632-647.
- J.A. Estes, R.J. Jameson, J.L. Bodkin and D.R. Carlson. 1994. Status and trends of the California sea otter population. In E.T. LaRoe III, G.S. Farris, C.E. Puckett and P.D. Doran, editors. *Our Living Resources 1994: A report to the nation on the distribution, abundance and health of U.S. plants, animals and ecosystems*. National Biological Service. Washington D.C. pages 110-112.
- Jameson, R.J. and J.L. Bodkin. 1986. An incidence of twinning in the sea otter (*Enhydra lutris*). *Marine Mammal Science*. 2(4):304-309.
- Larson, S., R.J. Jameson, J.L. Bodkin, M. Staedler and P. Bentzen. 2002. Microsatellite and MTDNA sequence variation within and among remnant, source and translocated sea otter (*Enhydra lutris*) populations. *J. Mammalogy* 83(3):893-906.
- Monson, D.H., D.F. Doak, B.E. Ballachey, A. Johnson, and J.L. Bodkin. 2000. Long-term impacts of the Exxon Valdez oil spill on sea otters, assessed through age-dependent mortality patterns. *Proceedings National Academy of Sciences, USA*. 97(12):6562-6567.



- Monson, D.H., J.A. Estes, J.L. Bodkin and D.B. Siniff. 2000. Life history plasticity and population regulation in sea otters. *Oikos*. 90:3 457-468.
- Robards, M.D., G. Drew, J.F. Piatt, J.M. Anson, A. Abookire, J.L. Bodkin, P.N. Hooge, and, S. Speckman. 2003. Ecology of selected marine communities in Glacier Bay: zooplankton, forage fish, seabirds and marine mammals. USGS Alaska Science Center, Anchorage, Alaska. 156 pp.
- Scribner, K.T., J.L. Bodkin, B.E. Ballachey, S.R. Fain, M.A. Cronin and M. Sanchez. 1997. Population and genetic studies of sea otter (*Enhydra lutris*): A review and interpretation of available data. Pages 197-208 in A.E. Dizon, S.J. Chivers, and W.F. Perrin, eds. Molecular genetics of marine mammals. Special Publication 3 by the Society for Marine Mammalogy. Allen Press.
- Udevitz, M.S., J.L. Bodkin and D.P. Costa. 1995. Sea otter detectability in boat-based surveys of Prince William Sound, Alaska. *Marine Mammal Science*. 11(1) :59-71
- VanBlaricom, G.R., A. K. Fukuyama, C. E. O'Clair, D. H. Monson, S. C. Jewett, T.K. Gage, T. A. Dean and., J. L. Bodkin. 2000. Sea otter (*Enhydra lutris*) perspective: Mechanisms of impact and potential recovery of nearshore vertebrate predators following the 1989 Exxon Valdez oil spill. Part C. Symmetry of trophic linkages among sea otters and their prey in Prince William Sound, Alaska: Evidence in the aftermath of the Exxon Valdez oil spill. Pages 3CA.1? 3C.57 in L. E.
- Holland-Bartels, editor (2000). Mechanisms of impact and potential recovery of nearshore vertebrate predators following the 1989 Exxon Valdez oil spill. Exxon Valdez Oil Spill Trustee Council Restoration Project Final Report (Restoration Project 95025-99025), U.S. Geological Survey, Alaska Biological Science Center, Anchorage, Alaska, USA.
- VanBlaricom, G.R., D.C. Reed, C. Harrold and J.L. Bodkin. 1985. A sublittoral population of *Pleurophycus gardneri* Setchell and Saunders 1900 (Phaeophyceae: Laminariaceae) in central California. *Bull. Southern California Acad. Sci.* 84(3).

**Map:**



### Steller sea lion pup counts and branding

**Related Park:** Alaska Region

**Project Affiliations:** National Oceanic and Atmospheric Administration; National Marine Mammal Laboratory; National Marine Fisheries Service

**Website Address:** <http://nmml.afsc.noaa.gov/AlaskaEcosystems/sslhome/stellerhome.html>

**Primary Contact:**

Tom Loughlin  
National Marine Mammal Laboratory  
7600 Sand Point Way, NE  
Seattle, WA 98115 United States  
Voice: (206)526-4040 fax: none given

**Principal Investigators:**

**Hypotheses:**

Objectives specific to this research category will include:

- Conduct pup counts and brand pups on selected rookeries as part of studies to monitor the population, determine dispersal rates, and estimate vital rates,
- Conduct brand resight cruises to determine dispersal rates and estimate vital rates

These surveys provide the baseline data required to evaluate the multiple hypotheses proposed for sea lion declines/lack of recovery (nutritional limitation, predation, climate change, etc).

As part of the core research program, researchers on these surveys will collect and analyze biological information related to Steller sea lion:

- Status and trends: To monitor population changes, better understand sea lion movement patterns, seasonal variation in distribution, and relationships between the distributions of sea lions, their prey, and fisheries,
- Stock structure: To elucidate sea lion demographic units and their trends, and develop protective measures that are appropriately scaled,
- Foraging ecology: To describe the diet and prey of sea lions, predator-prey dynamics, energetics, and foraging distributions of sea lions,
- Mortality and life history: To determine age-specific mortality rates and reproduction rates for population modeling, including pup branding and resighting.

**Data Being Collected:**

Pup counts, brand resights

**Progress:**

**First Year Collected:**

**Duration of Project:**

**Duration Descript:** Ongoing

**West:** -180

**East:** -147

**North:** 61

**South:** 51

**Publications:**

Sease, J.L. and C.J. Gudmundson. 2002. Aerial and land-based surveys of Steller sea lions (*Eumetopias jubatus*) from the western stock in Alaska, June and July 2001 and 2002. U.S. Department of Commerce, NOAA Technical Memorandum NMFS-AFSC-131, 45 pp.

Sease, J.L. and T.R. Loughlin. 1999. Aerial and Land-Based surveys of Steller sea lions (*Eumetopias jubatus*) in Alaska, June and July 1997 and 1998. U.S. Department of Commerce, NOAA Technical Memorandum NMFS-AFSC-100, 61 pp.

Sease, J.L., J.M. Strick, R.L. Merrick, and J.P. Lewis. 1999. Aerial and Land-Based surveys of Steller sea lions (*Eumetopias jubatus*) in Alaska, June and July 1996. U.S. Department of Commerce, NOAA Technical Memorandum NMFS-AFSC-99, 43 pp.

Sease, J.L., W.P. Taylor, T.R. Loughlin, and K.W. Pitcher. 2001. Aerial and Land-Based Surveys of Steller Sea Lions (*Eumetopias jubatus*) in Alaska, June and July 1999 and 2000. U.S. Department of Commerce, NOAA Technical Memorandum NMFS-AFSC-122, 52 pp.

**Comments:**

Sites are numerous--lat/long of sites are listed at:

<http://www.fakr.noaa.gov/regs/226table1.pdf>

**Map Description:** Steller sea lion rookeries and haul-outs from the Aleutian Islands to the Kenai Peninsula

**Map:**



Steller sea lion rookeries and haul-outs from the Aleutian Islands to the Kenai Peninsula

## Biological, Marine Mammals

### Steller Sea Lions and Predation by Killer Whales in Kenai Fjords/Prince William Sound; Killer Whale Monitoring in Kenai Fjords/Prince William Sound, Killer Whales and Steller sea lions; Predator/Prey Relationships

**Related Park:** Alaska Region

**Project Affiliations:** Alaska Sea Life Center; North Gulf Oceanic Society; North Pacific University Marine Mammal Research Consortium; Exxon Valdez Oil Spill Trustee Council

**Website Address:** none given

**Primary Contact:**

Craig Matkin  
North Gulf Oceanic Society  
Homer, AK 99603 United States  
Voice: (907)235-6590 fax: none given  
comatkin@xyz.net

**Principal Investigators:**

Lance Barret Lennard  
No address  
Vancouver, BC Canada  
Voice: (604)244-4345 fax: none given  
barrett@zoology.ubc.ca

**Hypotheses:**

Determine impact of Killer Whales on Steller sea lion populations (Hypothesis: Killer whales are responsible for the lack of recovery of Steller sea lion populations). Determine population trajectories for Resident and Transient killer whale populations in Kenai Fjords/Prince William Sound and long-term impacts of EVOS (Hypothesis: Resident and transient killer whales have recovered from the effects of the Exxon Valdez Oil Spill).

**Data Being Collected:**

Data being collected in 2003: Identification Photos of Individual Killer Whales, Genetic and Contaminant sampling of known individuals, Acoustic recordings of groups, Distribution and Movements, Feeding Habits

**Progress:** In work

**First Year Collected:** 1994

**Duration of Project:**

**Duration Descript:**

**West:** -173

**East:** -130

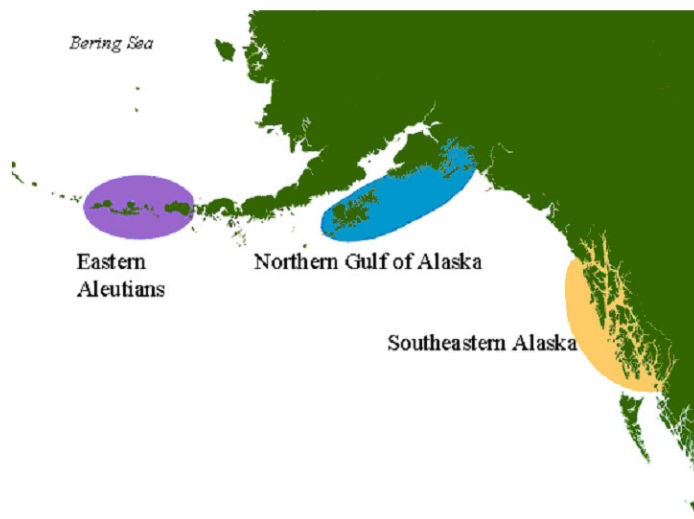
**North:** 61.2

**South:** 52

**Publications:**

C.O. Matkin, G. Ellis, L. Barrett Lennard, H. Yurk, E. Saulitis, D. Scheel, P. Olesiuk, G. Ylitalo. 2003. Comprehensive Killer Whale Investigation (Restoration Project 00112 Final Report), North Gulf Oceanic Society, Homer, Alaska.

**Map:**



**AnaGisa - Census of Marine Life**

**Related Park:** Southwest Alaska Network  
**Project Affiliations:** University of Alaska Fairbanks, School of Fisheries and Ocean Science, Institute of Marine Science  
**Website Address:** <http://www.westnrc.uaf.edu>

**Primary Contact:**

Brenda Konar  
University of Alaska Fairbanks, School of Fisheries and Ocean  
Science, Institute of Marine Science  
No address  
Voice: none given fax: none given

**Principal Investigators:**

Katrin Iken  
University of Alaska Fairbanks, School of Fisheries and Ocean  
Science, Institute of Marine Science  
No address  
Voice: none given fax: none given

**Hypotheses:**

Near-shore biodiversity studies along a pole-to-pole latitudinal gradient by applying protocols developed under the Census of Marine Life program. After initial sampling in south central Alaska, the gradient will develop further throughout Alaska, along the pacific coast of North and South America into the Antarctic.

**Data Being Collected:**

Data being collected in 2003: Collection of flora and fauna for identification and voucher collection

**Progress:** In work  
**First Year Collected:** 2003  
**Duration of Project:** 2004  
**Duration Descript:** 2 years

**West:** -155  
**East:** -145  
**North:** 61.5  
**South:** 56

**Database on the Marine Invertebrate Macrofauna of Prince William Sound: An Addition to the University of Alaska Museum's ARCTOS Network**

**Related Park:** Alaska Region  
**Project Affiliations:** University of Alaska Museum  
**Website Address:** <http://arctos.museum.uaf.edu>

**Primary Contact:**

Nora R. Foster  
University of Alaska Museum  
907 Yukon Drive  
Fairbanks, AK 99099 United States  
Voice: (907)474-7731 fax: (907)474-5469  
[fyaqua@uaf.edu](mailto:fyaqua@uaf.edu)

**Principal Investigators:**

**Hypotheses:**

Data sets that present basic taxonomic and biogeographic information at the species level for 1876 plant and animal species from Prince William Sound were compiled as part of research on potential introductions of nonindigenous species. This proposal seeks funding to edit the data on the 1343 invertebrate species, and to make the literature and specimen records of their occurrences available on the University of Alaska Museum's ARCTOS web-accessible database.

**Data Being Collected:**

Data being collected in 2003: Data sets describing biodiversity of Prince William Sound compiled from peer reviewed literature, input from other experts, UAM specimens obtained as part of Project no. 02608 funded by EVOS in FY2002: Permanent Archiving of Specimens Collected in Nearshore Habitats, and work lead by Brenda Konar to GEM and the Census of Marine Life for Alaska Natural Geography in Shore Areas (ANAGISA).

**Progress:** In work

**First Year Collected:**

**Duration of Project:**

**Duration Descript:** 1 year

**West:** -149

**East:** -144.5

**North:** 61.5

**South:** 59.7

**Publications:**

Foster N. R. and H. M. Feder 2000. Biodiversity of Prince William Sound. Chapter 10 In Hines, A. H. et al. 2000. Biological invasion of cold-water ecosystems: ballast-mediated introductions in Port Valdez/Prince William Sound, Alaska Final Project Report.

Foster, N. R. and M. K. Hoberg. 2003. Permanent archiving of specimens collected in nearshore habitats, Exxon Valdez Oil Spill Restoration Project Final Report (Restoration Project 02628), University of Alaska, Fairbanks, Alaska Hines, A. H., Ruiz, G. M., J. Chapman, G. I. Hansen, J. T. Carlton, N. R. Foster, and H. M. Feder. 2000. Biological invasions of cold-water ecosystems: ballast-mediated introductions in Port Valdez/Prince William Sound, Alaska Final Project Report to Alaska Sea Grant College Program, U. S. Fish and Wildlife Service, and the Regional Citizens Advisory Committee for Prince William Sound.

## Westward Region Small-Mesh Trawl Survey

**Related Park:** Southwest Alaska Network  
**Project Affiliations:** Alaska Department of Fish and Game  
**Website Address:** none given

**Primary Contact:**

Dave Jackson  
 Alaska Department of Fish and Game  
 211 Mission Road  
 Kodiak, AK 99615 United States  
 Voice: (907)486-1846 fax: none given  
 david\_jackson@fishgame.state.ak.us

**Principal Investigators:**

**Hypotheses:**

The first objective is assessment of the distribution and abundance of pandalid shrimp populations primarily northern or pink shrimp *Pandalus borealis*, sidestriped shrimp *Pandalopsis dispar*, and humpy shrimp *Pandalus goniurus*. Population estimates for shrimp will be produced using an area swept technique and compared with established thresholds to determine the potential for commercial fishery openings. Secondary objectives include determining the species composition of the entire catch in survey hauls, obtaining length frequencies of commercially important shrimp and groundfish, generating relative density estimates for forage fish species and tagging Pacific cod *Gadus macrocephalus* as part of a mark-recapture study.

**Data Being Collected:**

Data being collected in 2003: Approximately 120 sample stations will be selected from survey grids and strata that have been utilized since the middle 1970s in the ADF&G shrimp research program. The entire catch for each tow will be sorted to species and weighed. Commercially important groundfish, shrimp, and forage fish will be sampled for length and weight data. Population estimates for shrimp will be generated using an area swept technique.

<b><u>Progress:</u></b>	In work	<b><u>West:</u></b>	-156.5
<b><u>First Year Collected:</u></b>	2003	<b><u>East:</u></b>	-149.5
<b><u>Duration of Project:</u></b>	2004	<b><u>North:</u></b>	59
<b><u>Duration Descript:</u></b>	Work is planned for September 2003 through February 2004 with the at sea portion 9/29/03-10/28/03.	<b><u>South:</u></b>	56

**Publications:**

- Anderson, P.J. 2000. Pandalid Shrimp as Indicators of Ecosystem Regime Shift. J. Northw. Atl. Fish. Sci., Vol. 27: 1-10.
- Anderson, P.J., and J.F. Piatt. 1999. Community reorganization in the Gulf of Alaska following ocean climate regime shift. Mar. Ecol. Prog. Ser., 189: 117-123.
- Anderson, P.J., J.E. Blackburn, and B.A. Johnson. 1997a. Declines of forage fish species in the Gulf of Alaska, 1972-95, as indicators of regime shift. In: Proceedings of the International Symposium on the Role of Forage Fishes in Marine Ecosystems, November 13-16, 1996, Anchorage, Alaska. B.S. Baxer (ed.) 1997. University of Alaska. Alaska Sea Grant Rep., 97-01.
- Jackson, P.B., L.J. Watson, and J.A. McCrary. 1983. The Westward region Shrimp Fishery and Shrimp Research Program, 1968-1981. Alaska Department of Fish and Game, Division of Commercial Fisheries, Informational Leaflet No. 216, Juneau.
- Ruccio, M.P. 1999. Trawl survey of shrimp in the Kodiak District, 1998. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report No. 4K99-52, Kodiak.
- Ruccio, M.P. 2003. Trawl Survey of Shrimp and Forage Fishes Abundance in the Kodiak District, 2001. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report No. 4K03-4, Kodiak

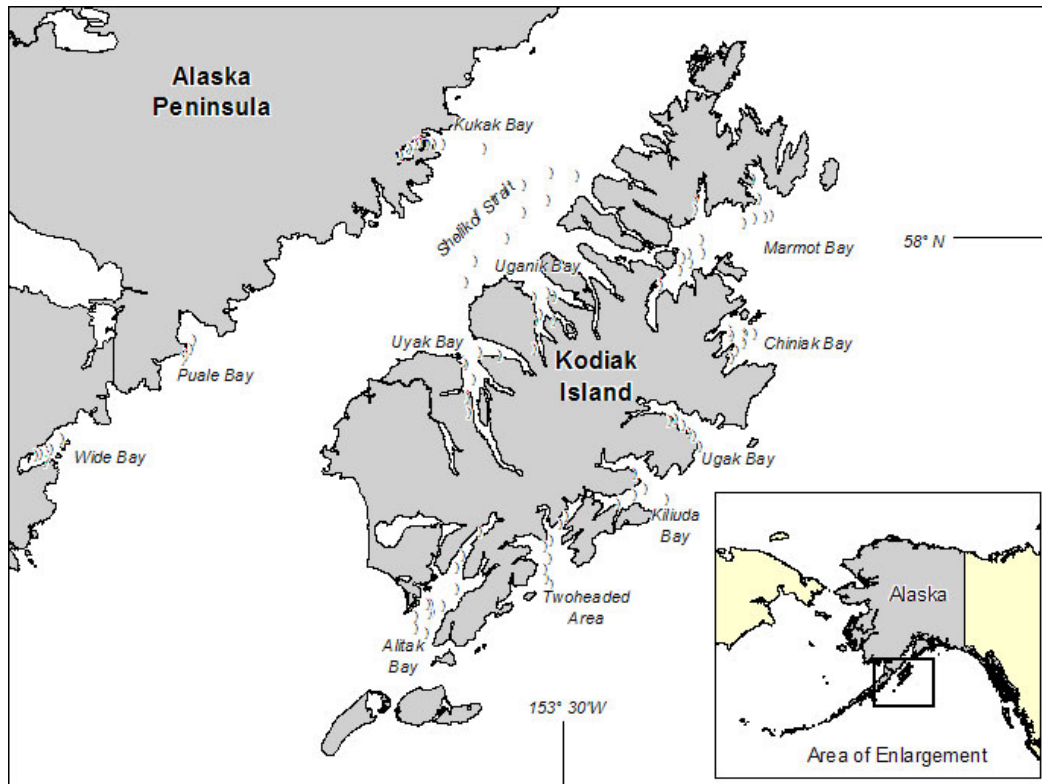
**Comments:**

The sampling gear is an 18.6-m high opening research trawl with 3.1-cm stretch mesh throughout the mouth, body, and codend. The triple bridle net will be towed for a standard distance of 1.85 km at each site.

**Map Description:**

Map showing haul locations from the 2001 small-mesh trawl survey. Sample sites will be similarly located in 2003.

**Map:**





### A Continuous Plankton Recorder based survey to monitor the Gulf of Alaska and detects ecosystem change

**Related Park:** Alaska Region

**Project Affiliations:** Exxon Valdez Oil Spill Trustee Council; Gulf Ecosystem Monitoring; North Pacific Research Board

**Website Address:** [http://www.sahfos.org/pacific\\_project/htm](http://www.sahfos.org/pacific_project/htm)

**Primary Contact:**

Sonia Batten  
Sir Alister Hardy Foundation For Ocean Science  
SAHFOS, c/o 4737 Vista View Crescent  
Nanaimo, BC V9V 1N8 Canada  
Voice: none given fax: none given  
soba@mail.pml.ac.uk

**Principal Investigators:**

David Welch  
Pacific Biological Station  
  
Nanaimo, BC V9R 5K6 Canada  
Voice: none given fax: none given  
welch@pac.dfo-mpo.gc.ca

**Hypotheses:**

Plankton are a critical link in the marine food chain that respond rapidly to climate change and form the link between the atmosphere and upper trophic levels. Many important marine resources in the GoA are strongly influenced by changes in the ocean climate. We present evidence from recent CPR work showing that significant changes occurred in all plankton communities in the GoA, associated with the recent climate shift, and the CPR is an appropriate tool for detecting such changes. This project collects seasonal plankton data across the North Pacific using commercial vessels.

**Data Being Collected:**

**Data Collected in the past 2 years:** Phytoplankton and zooplankton abundance data

**Progress:** In work

**First Year Collected:**

**Duration of Project:**

**Duration Descript:** at least until 2006

**West:** -180

**East:** -120

**North:** 62

**South:** 32

**Publications:**

Batten, S.D and Crawford, W.R. (in press). The influence of coastal origin eddies on oceanic plankton distributions in the eastern Gulf of Alaska. Deep Sea Research II

Batten, S.D. and Welch, D.W. (in press). Changes on oceanic zooplankton populations in the North-east Pacific associated with the possible climate regime shift of 1998/1999. Deep Sea Research II

Batten, S.D., Welch, D.W., and Jonas, T. (2003) Latitudinal differences in the duration of development of *Neocalanus plumchrus* copepodites. Fisheries Oceanography, 12.

## Kenai Fjords Oral History and Archaeology Project

**Related Park:** Kenai Fjords National Park  
**Project Affiliations:** US National Park Service; Alaska Sea Life Center  
**Website Address:** [http://www.mnh.si.edu/arctic/html/alaska\\_kenai.html](http://www.mnh.si.edu/arctic/html/alaska_kenai.html)

### Primary Contact:

Aron L. Crowell  
 Smithsonian Institute  
 121 W. 7th Ave  
 Anchorage, AK 99501 United States  
 Voice: (907)343-6162 fax: (907)343-6130  
 acrowell@alaska.net

### Principal Investigators:

### Hypotheses:

In collaboration with Alutiiq (Alaska Native) villages and the Pratt Museum (Homer), the Arctic Studies Center (National Museum of Natural History, Smithsonian Institution) will investigate the cultural and environmental history of Kenai Fjords National Park (KEFJ). Artifacts and faunal samples from excavations at Aialik Bay archaeological sites, combined with oral histories and traditional knowledge about coastal subsistence practices, will provide data on ecosystem change and human responses during the Little Ice Age (A. D. 1250-1900).

### Data Being Collected:

Data being collected in 2003: Archaeological artifacts (stone and bone tools, historic period artifacts) and faunal samples from sites in Aialik Bay. Stable isotope analysis (O18, N15, C13) of sea mammal, fish, and shellfish remains from two late Little Ice Age dates (ca. A. D. 1800 and 1880).

<b><u>Progress:</u></b>	In work	<b><u>West:</u></b>	-150
<b><u>First Year Collected:</u></b>	2003	<b><u>East:</u></b>	-149
<b><u>Duration of Project:</u></b>	2005	<b><u>North:</u></b>	60
<b><u>Duration Descript:</u></b>	Fieldwork July 7 – August 17, 2003. Total duration of project 3 years (2002-2004).	<b><u>South:</u></b>	59.4

### Publications:

Crowell, Aron L. and Daniel H. Mann, 1996, Sea Level Dynamics, Glaciers, and Archaeology along the Central Gulf of Alaska Coast, Arctic Anthropology 33(2): 16-37.

Crowell, Aron L. and Daniel H. Mann, 1998, Archaeology and Coastal Dynamics of Kenai Fjords National Park, Alaska, National Park Service, Anchorage. (available from NPS or Arctic Studies Center).

Preliminary report on 2002 fieldwork (available from PI)

## Prehistoric and Historic Subsistence-Settlement Patterns on the Central Alaska Peninsula

**Related Park:** Southwest Alaska Network  
**Project Affiliations:** US Fish and Wildlife Service; National Science Foundation; University of Arkansas  
**Website Address:** none given

### Primary Contact:

Patricia L. McClenahan  
 US Fish and Wildlife Service  
 PO Box 242226  
 Anchorage, AK 99524 United States  
 Voice: (907)696-4549 fax: (907)696-7505  
 Patricia\_L\_McClenahan@fws.gov

### Principal Investigators:

Allen P. McCartney Professor  
 PO Box 242226  
 Anchorage, AK 99524 United States  
 Voice: (907)786-3875 fax: (907)696-7505

### Hypotheses:

This dissertation studies the archaeological, ethnographic, and environmental record bearing on the prehistoric/historic lifeways of the people of the Alaska Peninsula. The primary focus is on creating and testing a predictive model of the subsistence-settlement behavior of the inhabitants of the Peninsula. The research questions being addressed are:

- Why have people on the Alaska Peninsula chosen to live where they have?
- How have people arranged their subsistence activities within the region after around 1,000 years ago?
- What factors went into selecting placement of habitation sites? What are some correlates of site selection? What particular landscape features and natural resources do archaeological sites in the study area correspond with?
- Which model or models have value for predicting the location of habitation sites on the Pacific coast of the Alaska Peninsula?

The basis for constructing the models is the archaeological record (records of known habitation sites on the Alaska Peninsula), the ethnographic record, oral history given by living descendents, and data on habitat and subsistence resources to build the model. As appropriate, these data are statistically analyzed to ascertain patterns that might be employed as a basis for modeling. Ethnographic patterns are compared to archaeological patterns. A hybrid model for site prediction for the Alaska Peninsula, based on archaeology and ethnography, is then proposed.

Proposed Project: I wish to apply the model I constructed, and test it against the archaeological record on the Alaska Peninsula Pacific coast. I'm interested in studying environmental change through time, continuing to use an interdisciplinary approach.

### Data Being Collected:

No data have been or will be collected in 2003. I've been completing my dissertation, giving presentations, and writing a journal article.

### Progress:

### First Year Collected:

### Duration of Project:

### Duration Descript:

West: -158.5

East: -153

North: 58.5

South: 56.5

### Publications:

Draft. McClenahan, Patricia L. Prehistoric and Historic Subsistence-Settlement Patterns on the Central Alaska Peninsula. Dissertation submitted in partial fulfillment of the requirements for the PhD. University of Arkansas. Fayetteville, Arkansas.

In preparation McCartney, Allen P. and Patricia L. McClenahan. Historic Subsistence-Settlement Patterns in the Lake Becharof Region of the Central Alaska Peninsula, Alaska. Festschrift Volume in Honor of Allen P. McCartney. Arctic Anthropology.

## Risks and Benefits of Rural Diet

**Related Park:** Alaska Region

**Project Affiliations:** National Institute of Environmental Health Sciences; US Fish and Wildlife Service

**Website Address:** N/A

### Primary Contact:

Sue Unger  
Research  
Coordinator  
National Institute of Environmental Health Sciences  
Anchorage, AK 99501 United States  
Voice: (907)222-4215 fax: none given  
sueu@apiai.com

### Principal Investigators:

Michael Brubaker  
Community Services Director  
National Institute of Environmental Health Sciences

Anchorage, AK 99501 United States  
Voice: (907)222-4217 fax: (907)279-4351

### Hypotheses:

Hypothesis: The benefits traditional foods outweigh the risks posed by contaminants. A diet composed largely of traditional foods (protein) is more healthy than a diet composed of substitute protein that can be purchased from rural stores.

Objective: Development of a model which combines community specific data on health effects, diet, and contaminant data to provide a process for understanding risks and benefits associated with subsistence and store bought diet in rural Alaska.

### Data Being Collected:

Data being collected in 2003: Samples of halibut and perhaps other subsistence species will be collected and analyzed for nutrient content and a variety of contaminants.

**Progress:** In work

**First Year Collected:**

**Duration of Project:** 2005

**Duration Descript:** Through 2005

**West:** -177

**East:** -150

**North:** 60

**South:** 51

### Publications:

Alaska Native Diet - Introduction to Dietary Benefits and Risks in Alaskan Villages (video) 2002

Alaska Native Diet - The Importance of Traditional Foods (video) 2003

Dietary Benefits and Risks in Alaska Native Villages - St. Paul Survey Results 2003.

## National Estuarine Research Reserve System-Wide Monitoring Program

**Related Park:** Southwest Alaska Network  
**Project Affiliations:** Alaska Department of Fish and Game, Kachemak Bay Research Reserve  
**Website Address:** <http://cdmo.baruch.sc.edu/home.html>, and <http://www.kbayrr.org/>

### Primary Contact:

Scott Pegau, Research Coordinator  
 Alaska Department of Fish and Game, Kachemak Bay  
 Research Reserve  
 2181 Kachemak Drive  
 Homer, AK 99603 United States  
 Voice: (907)235-4799 fax: (907)235-4794  
[scott\\_pegau@fishgame.state.ak.us](mailto:scott_pegau@fishgame.state.ak.us)

### Principal Investigators:

Carl Schoch, Research Coordinator  
 Alaska Department of Fish and Game, Kachemak Bay Research  
 Reserve  
 2181 Kachemak Drive  
 Homer, AK 99603 United States  
 Voice: none given fax: none given

### Hypotheses:

Water quality and meteorological data are collected by the Kachemak Bay Research Reserve in accordance with NOAA directives. Water quality parameters are collected using YSI 6600 dataloggers and monthly grab samples. Meteorological data is collected using a Campbell Scientific CR10X which samples every five seconds to produce both hourly and daily averages. An instantaneous sample is also taken every 15 minutes. Yearly edited data are available for download in a comma delimited text file and can be imported directly into a database or spreadsheet program.

### Data Being Collected:

Data being collected in 2003: Water temperature, specific conductivity, salinity, dissolved oxygen, depth, pH, chlorophyll fluorescence, and turbidity; nitrate, nitrite, ammonium, ortho-phosphate, silica, and chlorophyll-a; air temperature, relative humidity, solar radiation, barometric pressure, rainfall, wind speed and wind direction.

**Progress:** In work

**First Year Collected:** 2001

**Duration of Project:**

**Duration Descript:** 2001 to ?

**West:** -152

**East:** -150.75

**North:** 59.9

**South:** 59.3

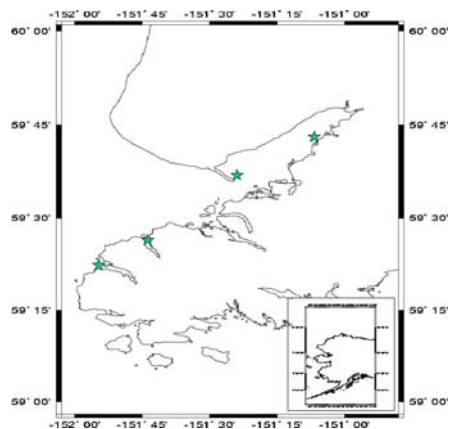
### Publications:

Annual metadata reports are available by contacting Carl Schoch or Scott Pegau at the KBRR.

### Comments:

There are four water quality dataloggers deployed one meter above the bottom at a depth of eight meters: a moored instrument at Port Graham (N59 22.236 W151 53.771), a fixed mount at Seldovia (N59 26.499 W151 43.400), a moored instrument at Bear Cove (N59 42.912 W151 05.454), and a fixed mount at Homer (N59 36.209 W151 25.053). Monthly grab samples are collected at the Seldovia and Homer fixed instruments. A full tidal cycle is also sampled approximately every two hours for 24 hours at Homer using an automated sampler.

### Map:



## Visible remote sensing of the Gulf of Alaska

**Related Park:** Alaska Region

**Project Affiliations:** Alaska Department of Fish and Game, Kachemak Bay Research Reserve; Gulf Ecosystem Monitoring

**Website Address:** N/A

**Primary Contact:**

Scott Pegau  
Research  
Coordinator  
Alaska Department of Fish and Game, Kachemak Bay  
Research Reserve  
2181 Kachemak Drive  
Homer, AK 99603 United States  
Voice: (907)235-4799 fax: (907)235-4794  
scott\_pegau@fishgame.state.ak.us

**Principal Investigators:**

**Hypotheses:**

A number of visible remote sensing satellites have been observing the Gulf of Alaska and its watersheds for the past five years and will continue to make observations into the future. Much of the data is available through NASA; however, the data is not easily accessible, fully quality controlled, or necessarily the variables of interest. This synthesis proposal aims to

- 1) determine which products would be useful to resource managers and scientists,
- 2) develop a system to process and provide the existing and future satellite data in a format useful to most users, and
- 3) provide quality control.

The satellite imagery covers all zones described in the GEM Program Document, but this proposal focuses on the oceanic components. The work is a collaborative effort led by the Kachemak Bay Research Reserve with the University of Alaska-Fairbanks providing processing facilities.

**Data Being Collected:**

Data being collected in 2003: Ocean color estimates of surface chlorophyll

**Progress:** In work

**First Year Collected:** 1997

**Duration of Project:** 2003

**Duration Descript:** 1997-2003

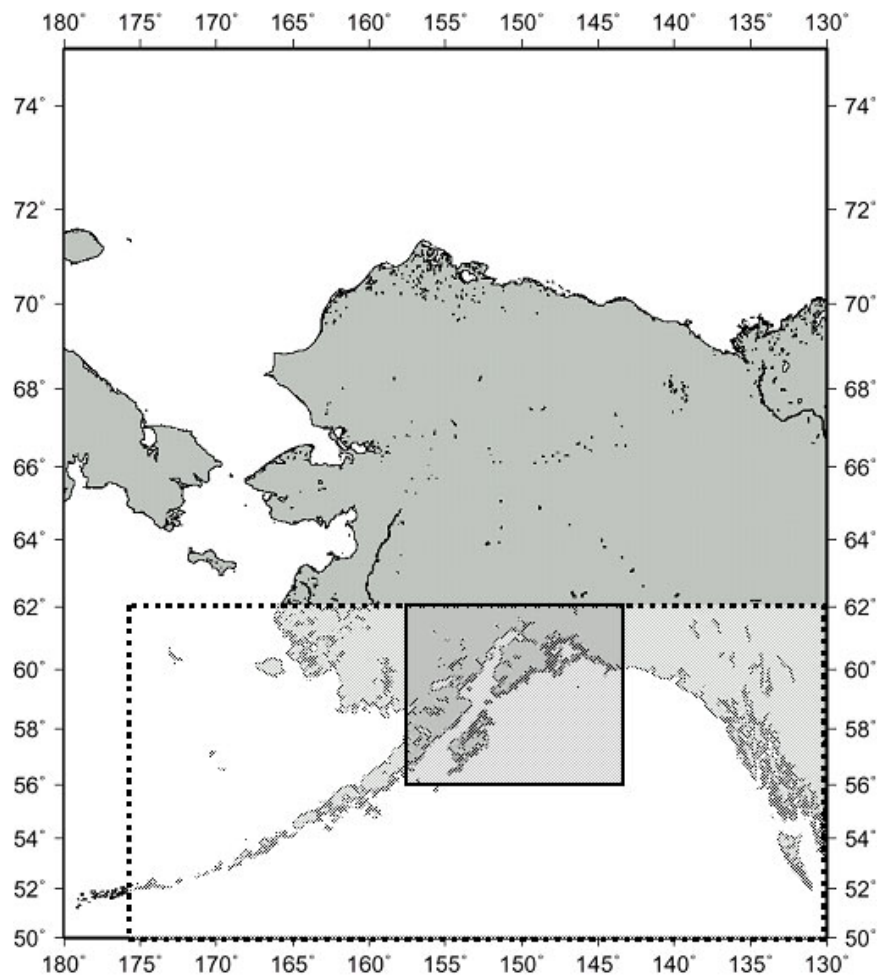
**West:** -176

**East:** -130

**North:** 62

**South:** 50

**Map:**



Data within the dashed box will be processed to 5 km resolution. Data within the gray box will be processed to full 1 km resolution in order to provide the highest detail of small current structures associated with the ACC and allow the data to extend as close as possible to the complex coastline.



### GLOBEC Northeast Pacific: Satellite-observed ocean variability

**Related Park:** Alaska Region

**Project Affiliations:** National Aeronautics and Space Administration; National Science Foundation; National Oceanic and Atmospheric Administration

**Website Address:** <http://WAVY.UMEOCE.MAINE.EDU>

**Primary Contact:**

Andrew Thomas  
University of Maine  
5741 Libby Hall  
Orono, ME 04469-5741 United States  
Voice: (207)581-4335 fax: none given  
thomas@maine.edu

**Principal Investigators:**

**Hypotheses:**

The overall goal of this project is to use data from multiple satellite sensors to characterize and quantify the dominant modes of variability in the Northeast Pacific surface transport, SST and pigment concentrations on three space/time scales: Basin- and Interannual scales; Mesoscale and Event-to-Seasonal; Small-scale and Event.

**Data Being Collected:**

Data being collected in 2003: Daily 1km and 4km resolution SeaWiFS ocean color satellite data, fully processed, cloud masked and geo-registered, weekly composites, monthly composites

**Progress:** In work

**First Year Collected:** 2003

**Duration of Project:** 2004

**Duration Descript:** Daily throughout 2003 – 2004

**West:** -160

**East:** -135

**North:** 61

**South:** 50

## Evaluating Decadal-Scale Climate Change and Geomagnetic Paleointensity Records in Continental Shelf Strata on the Subarctic Pacific: Site Augmentation for IODP Proposal 597

**Related Park:** Alaska Region  
**Project Affiliations:** Joint Oceanographic Institutions/US Science Support Program; Integrated Ocean Drilling Program; Global Ocean Ecosystem Dynamics  
**Website Address:** <http://web.clas.ufl.edu/users/jaeger/goapaleo.htm>

**Primary Contact:**

John Jaeger  
 University of Florida  
 PO Box 112120  
 Department of Geological Sciences  
 University of Florida  
 Gainesville, FL 32611-2120 United States  
 Voice: (352)846-1381 fax: (352)392-9294

**Principal Investigators:**

**Hypotheses:**

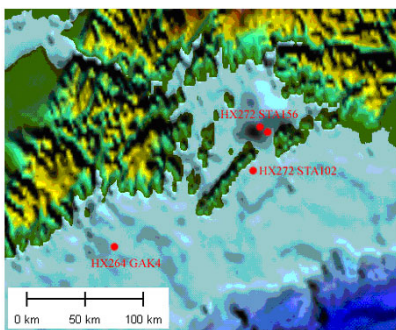
Southern Alaska presents a key area in the northern hemisphere where high quality records of the interplay of Late Cenozoic tectonics and climate can be examined. The extreme Quaternary sediment accumulation rates (upwards of 5 cm/yr) of glacially derived silty clays have resulted in a potentially sub-decadal resolution stratal record. Following the Spring 2002 review of IODP proposal 597 "A high-resolution marine sedimentary record of late Cenozoic climate and tectonics: A transect across the southern Alaska continental margin" by both ISEPs, it was advised by the panels that future coring in support of drilling should be aimed at determining whether high-resolution records of the key paleoceanographic proxies can be obtained at the proposed sites. I am submitting a site augmentation proposal to obtain new data, as there are no preserved cores or samples of high quality that can be used to address concerns of the ISEEP regarding high-resolution records. I propose to utilize a cruise of opportunity that has been made available to me in July 2003 as part of the Northeast Pacific Global Ocean Ecosystem Dynamics (NEP-GLOBEC) program in which to collect a limited set of 3-m long kasten cores at key GLOBEC sampling sites in order to demonstrate decadal-scale changes in sedimentary properties using very high down-core sampling for proxy records of freshwater discharge directly related to the Pacific Decadal Oscillation. Additionally, preliminary environmental magnetism studies of modern Gulf of Alaska sediments indicate their strong potential as paleomagnetic dating tools. Consequently, along with Drs. Joseph Stoner and J.E.T. Channel, I am proposing to use direct observational data from the Sitka Alaska geomagnetic observatory and the global field model of Jackson et al., (2000) as a template to test the fidelity of these sediments as geomagnetic records and the refinement of an additional Holocene chronometer.

**Data Being Collected:**

Data being collected in 2003: Four sediment gravity cores collected; Each core analyzed for physical properties (bulk density and magnetic susceptibility using GEOTEK multisensor core logger); grain size; sedimentary structures via x-radiography; mass percent opal, carbon, nitrogen; stable carbon and nitrogen isotopes; geochronology via Pb-210/Cs-137.

<b><u>Progress:</u></b>	In work	<b><u>West:</u></b>	-151
<b><u>First Year Collected:</u></b>	2003	<b><u>East:</u></b>	-145
<b><u>Duration of Project:</u></b>	2004	<b><u>North:</u></b>	61.5
<b><u>Duration Descript:</u></b>	Through summer 2004	<b><u>South:</u></b>	57

**Map:**



## Monitoring dynamics of the Alaska coastal current and development of applications for management of Cook Inlet salmon

**Related Park:** Alaska Region

**Project Affiliations:** Gulf Ecosystem Monitoring; Alaska Department of Fish and Game; Alaska Department of Fish and Game, Kachemak Bay Research Reserve

**Website Address:** N/A

### Primary Contact:

Mark Willette  
Alaska Department of Fish and Game  
No address  
Voice: none given fax: none given  
mark\_willette@fishgame.state.ak.us

### Principal Investigators:

Scott Pegau, Research Coordinator  
Alaska Department of Fish and Game, Kachemak Bay Research Reserve  
2181 Kachemak Drive  
Homer, AK 99603 United States  
Voice: (907)235-4799 x6 fax: (907)235-4794  
scott\_pegau@fishgame.state.ak.us

### Hypotheses:

This project will collect physical oceanographic and fisheries data along a transect across lower Cook Inlet from Anchor Point to the Red River delta each day during July. The data will be made available to other researchers studying how the physical dynamics of the Alaska coastal current affects the productivity of biological resources in the region. Logistical support for the field sampling will be provided in part by an existing test fishing vessel chartered annually by the Alaska Department of Fish and Game to provide inseason projections of the size of salmon runs returning to the inlet. The project aims to use the physical oceanographic data to improve management of Cook Inlet salmon through improved inseason salmon run projections. Several hypotheses regarding effects of changing oceanographic conditions on salmon migratory behavior will be tested. The project will demonstrate the use of vessels-of-opportunity for collection of oceanographic data.

### Data Being Collected:

Temperature, salinity, water velocity, salmon acoustics

**Progress:** Complete

**First Year Collected:** 2003

**Duration of Project:** 2003

**Duration Descript:** July 2003

**West:** -154

**East:** -151

**North:** 60.5

**South:** 59.25

### Comments:

CTD casts at 6 stations

59 49.5 152 9.1

59 50.2 152 13.5

59 51.0 152 17.6

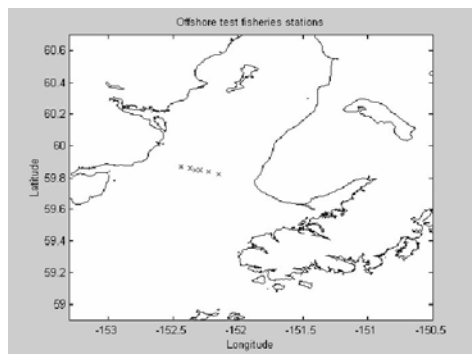
59 51.11 152 19.8

59 51.7 152 22.0

59 52.4 152 26.3

Towed ADCP, CTD, and fish acoustics between stations.

### Map:



**Shelf Salmon Survival Study, Highseas Salmon program, Fisheries and Oceans, Canada****Related Park:** Alaska Region**Project Affiliations:** Fisheries and Oceans Canada/Institute of Ocean Sciences; National Marine Fisheries Service; Bonneville Power Authority**Website Address:** none given**Primary Contact:**

David Welch  
 Fisheries and Oceans Canada/Institute of Ocean Sciences  
 Pacific Biological Station  
 Hammond Bay Road  
 Nanaimo, BC V9T 6N7 Canada  
 Voice: (250)756-7218 fax: (250)756-7053  
 welchd@pac.dfo-mpo.gc.ca

**Principal Investigators:****Hypotheses:**

The Shelf Salmon Survival Study operates a multi-year research survey to map ocean conditions determining the growth and survival of Pacific salmon along the West Coast of North America from the British Columbia-Washington border to Icy Strait, Alaska, and to identify where specific stocks of salmon forage in the continental shelf of these areas. We would like to expand the survey to west of Kodiak Island, Alaska. The NMFS is currently surveying the area off Washington and Oregon, and NMFS researchers work co-operatively with us on this project, particularly in the area of stock identification of the chinook and coho collected off British Columbia and Alaska, using their extensive baseline data.

Our initial results clearly demonstrate that West Coast salmon are undertaking rapid, directed migrations that take them well out of their region of origin and into regions of differing growth and survival potential.

Our research shows that different populations of salmon move to different locations along the coastal zone where they establish their ocean feeding grounds and (presumably) over-winter. The feeding success, growth, and fat content of chinook and coho salmon in different parts of the coastal zones of British Columbia and Alaska is very different. The relative survival of different stocks of salmon in the ocean therefore depends on where in the ocean they migrate to feed. For example, our calculations indicate that the ocean survival of Snake River chinook should be much lower than that of other Columbia River stocks that they have been compared to (such as the Hanford Reach stock) because they migrate to different parts of the ocean.

Our results also indicate that ocean conditions in 1998 substantially reduced the growth and survival of salmon foraging off southern British Columbia relative to salmon foraging farther north. However, ocean conditions in 1999 were dramatically different and apparently similar to those holding in the early 1970s, at the time that the Snake River hydrosystem was just being completed– and should have led to significantly better survival conditions. It appears that in 1999 the North Pacific Ocean underwent a sudden and dramatic shift in ocean conditions to one more favourable to Columbia River salmon, including a much deeper mixed layer and substantially higher nutrient concentrations. Associated with this change are better observed growth rates for juvenile salmon. It is important to measure these improved conditions now, while they persist, because they are likely to be short-lived; greenhouse gas forcing is likely to drive ocean climate back towards a more extreme version of the warmer climate holding through the 1980s and 1990s. As the 1980s and 1990s appeared to be a time of progressively poorer marine survival for salmon– with many populations becoming unsustainable even in the absence of all fishing– direct measurement of the degree to which the ocean affects various salmon populations needs to be made.

There are persistent resource conflicts in the Pacific Northwest between salmon and other resource uses (hydropower, forestry, and agriculture). Salmon are affected by many factors in both freshwater and the ocean. Because the number of salmon smolts entering the ocean are monitored in few populations, it has been the norm to assume that when the number of adults returning drops that it is the result of events happening in freshwater. Informed debate about the effect of these alternative resource sectors on salmon requires a direct assessment of the effect of ocean conditions on salmon populations; otherwise the effects of ocean conditions on salmon population declines are confounded with events occurring in freshwater. We intend to address this problem by establishing growth and potential survival conditions over a broad range of the coast of direct relevance to Columbia River salmon.

**Data Being Collected:**

Data being collected in 2003: Three CCGS W. E. Ricker surveys to the Gulf of Alaska, February 12-March 3; June 9-23; and October 2 to November 4, 2003.

**Progress:****First Year Collected:****Duration of Project:****Duration Descript:** 5-10 years**West:** -140**East:** -123**North:** 60**South:** 47

**Publications:**

- Welch D. W., J. F. T. Morris, E. Demers, and J.P. Eveson. 2002. CCGS W.E. Ricker Gulf of Alaska salmon survey, October, 1996. Can. Data Rep. Fish. Aquat. Sci. 1100: 64 p.
- Welch D. W., J. F. T. Morris, E. Demers, and J.P. Eveson. 2002. CCGS W.E. Ricker Gulf of Alaska salmon survey, October, 1996. Can. Data Rep. Fish. Aquat. Sci. 1100: 64 p.
- Welch, D. W., J. F. T. Morris, A. R. Ladouceur, S. Tucker, and E. Demers. 2002. CCGS W.E. Ricker Gulf of Alaska salmon surveys, 1998. Can. Data Rep. Fish. Aquat. Sci. 1103:
- Welch, D. W., J. F. T. Morris, A. R. Ladouceur, S. Tucker, and E. Demers. 2002. CCGS W.E. Ricker Gulf of Alaska salmon surveys, 1999. Can. Data Rep. Fish. Aquat. Sci. 1104:
- Welch, D. W., J. F. T. Morris, and E. Demers. 2002. CCGS W.E. Ricker Gulf of Alaska salmon survey, March - April, 1997. Can. Data Rep. Fish. Aquat. Sci. 1101:
- Welch, D. W., J. F. T. Morris, and E. Demers. 2002. CCGS W.E. Ricker Gulf of Alaska salmon survey, November - December, 1997. Can. Data Rep. Fish. Aquat. Sci. 1102:
- Welch, D. W., J. F. T. Morris, E. Demers, and B. L. Wing. 2002. F.V. Columbia Gulf of Alaska salmon survey, October 7 - November 10, 1995. Can. Data Rep. Fish. Aquat. Sci. 1099:
- Welch, D. W., J. F. T. Morris, E. Demers, and H. R. Carlson. 2002. CCGS W.E. Ricker Gulf of Alaska salmon survey, October 2-20, 1995. Can. Data Rep. Fish. Aquat. Sci. 1098:
- Welch, D. W., J. F. T. Morris, E. Demers, and H. R. Carlson. 2002. F.V. Anita J. Gulf of Alaska salmon survey, March 25 - April 9, 1995. Can. Data Rep. Fish. Aquat. Sci. 1097:
- Welch, D.W., J.F.T. Morris, E. Wittke, V.I. Smorodin. (1998): CCGS W.E. Ricker Gulf of Alaska Salmon Survey, November-December, 1997. North Pacific Anadromous Fish Commission Doc. No. 308 10p., 8 Figs, and 4 Tables.
- Welch, D.W., J.F.T. Morris, H.R. Carlson, E.V. Farley, B. Van Hardenberg, E.R. Carmack, and A. Münchow. 1997. Results from the CCGS W.E. Ricker Gulf of Salmon Survey, March 1997. North Pacific Anadromous Fish Commission Document No. 287. 18 Pages and 3 Figs. Alaska
- Welch, D.W., B.R. Ward, B.D. Smith, and F. Whitney. 1997. Changes Associated with the 1989-90 Ocean Climate Shift, and Effects on British Columbia Steelhead (*O. mykiss*) Populations. Pacific Stock Assessment Review Committee (PSARC) working paper S97-7.
- Welch, D.W., B.R. Ward, B.D. Smith, and J.P. Eveson. 2000. Temporal and spatial responses of British Columbia steelhead (*Oncorhynchus mykiss*) populations to ocean climate shifts. Fisheries Oceanography 9:1-16.
- Whitney, F., Wong, C.S., and P.W. Boyd. 1998. Interannual variability in nitrate supply to surface waters of the Northeast Pacific Ocean. Marine Ecology Progress Series 170: 15-23.
- Whitney, F.A., and H.J. Freeland. 1999. Variability in upper-ocean water properties in the NE Pacific Ocean Deep Sea Research 46: 2351-2370.

**Comments:**

LLAT\_dd LONG\_dd OFFSHORE

SEAK

58.384 137.242 OFF ICY PT, SEAK  
58.303 137.404 OFF ICY PT, SEAK  
58.222 137.565 OFF ICY PT, SEAK  
58.142 137.727 OFF ICY PT, SEAK  
58.061 137.888 OFF ICY PT, SEAK  
57.980 138.050 OFF ICY PT, SEAK  
57.906 138.194 OFF ICY PT, SEAK  
57.832 138.338 OFF ICY PT, SEAK  
57.758 138.482 OFF ICY PT, SEAK  
57.684 138.626 OFF ICY PT, SEAK  
57.610 138.770 OFF ICY PT, SEAK

57.536	138.914	OFF ICY PT, SEAK
57.462	139.058	OFF ICY PT, SEAK
57.388	139.202	OFF ICY PT, SEAK
56.300	134.908	OFF BARANOF IS, SEAK
56.253	135.025	OFF BARANOF IS, SEAK
56.208	135.133	OFF BARANOF IS, SEAK
56.163	135.243	OFF BARANOF IS, SEAK
56.117	135.355	OFF BARANOF IS, SEAK
56.073	135.467	OFF BARANOF IS, SEAK
56.027	135.575	OFF BARANOF IS, SEAK
55.983	135.688	OFF BARANOF IS, SEAK
55.900	135.883	OFF BARANOF IS, SEAK
55.823	136.077	OFF BARANOF IS, SEAK
55.747	136.275	OFF BARANOF IS, SEAK
55.670	136.473	OFF BARANOF IS, SEAK
55.593	136.672	OFF BARANOF IS, SEAK
55.517	136.870	OFF BARANOF IS, SEAK
54.788	133.055	OFF FORRESTER IS, SEAK
54.775	133.186	OFF FORRESTER IS, SEAK
54.763	133.316	OFF FORRESTER IS, SEAK
54.751	133.447	OFF FORRESTER IS, SEAK
54.739	133.577	OFF FORRESTER IS, SEAK
54.727	133.708	OFF FORRESTER IS, SEAK
54.715	133.838	OFF FORRESTER IS, SEAK
54.703	133.969	OFF FORRESTER IS, SEAK
54.691	134.099	OFF FORRESTER IS, SEAK
54.667	134.363	OFF FORRESTER IS, SEAK
54.639	134.633	OFF FORRESTER IS, SEAK
54.611	134.903	OFF FORRESTER IS, SEAK
54.583	135.173	OFF FORRESTER IS, SEAK
54.555	135.443	OFF FORRESTER IS, SEAK
54.527	135.713	OFF FORRESTER IS, SEAK

#### INSIDE SEAK

56.067	134.073	AFFLECK CAN AL, I_SEAK
55.981	134.177	CAPE DECISION, I_SEAK
56.318	134.597	CHATHAM ST, I_SEAK
56.556	134.608	CHATHAM ST, I_SEAK
56.755	134.603	CHATHAM ST, I_SEAK
56.973	134.497	CHATHAM ST, I_SEAK
57.285	134.753	CHATHAM ST, I_SEAK
57.523	134.780	CHATHAM ST, I_SEAK
57.769	134.905	CHATHAM ST, I_SEAK
57.983	134.861	CHATHAM ST, I_SEAK
58.140	134.890	CHATHAM ST, I_SEAK
56.011	132.745	CLARENCE ST, I_SEAK
55.843	132.491	CLARENCE ST, I_SEAK
55.620	132.321	CLARENCE ST, I_SEAK
55.470	132.074	CLARENCE ST, I_SEAK
55.267	131.976	CLARENCE ST, I_SEAK
56.191	132.826	CLARENCE ST, I_SEAK
54.860	131.814	CLARENCE ST, I_SEAK
54.810	133.018	DOLGOI IS, I_SEAK
55.025	133.270	FISHERMAN'S COVE, I_SEAK
57.059	134.384	FREDERICK SD, I_SEAK
58.180	135.141	ICY ST, I_SEAK
58.215	135.498	ICY ST, I_SEAK
58.301	136.321	ICY ST, I_SEAK
58.334	136.099	ICY ST, I_SEAK
58.261	136.018	ICY ST, I_SEAK
58.323	135.727	ICY ST, I_SEAK
58.266	135.736	ICY ST, I_SEAK
58.101	135.122	ICY ST, I_SEAK
58.303	135.565	ICY ST, I_SEAK
58.274	135.873	ICY ST, I_SEAK



58.278	136.452	ICY ST, I_SEAK
58.233	136.552	ICY ST, I_SEAK
58.057	134.905	PT AUGUSTA, I_SEAK
56.328	134.350	PT COSMOS, I_SEAK
56.047	134.256	PT CROWLEY, I_SEAK
54.912	133.125	ROCKWELL PT, I_SEAK
58.193	134.373	STEPHENS P, I_SEAK
58.306	134.722	STEPHENS P, I_SEAK
56.208	133.843	SUMNER ST, I_SEAK
56.100	133.861	SUMNER ST, I_SEAK
56.168	133.777	SUMNER ST, I_SEAK
56.306	133.776	SUMNER ST, I_SEAK
56.377	133.624	SUMNER ST, I_SEAK
56.179	134.318	TABLE BAY, I_SEAK

#### CANADA

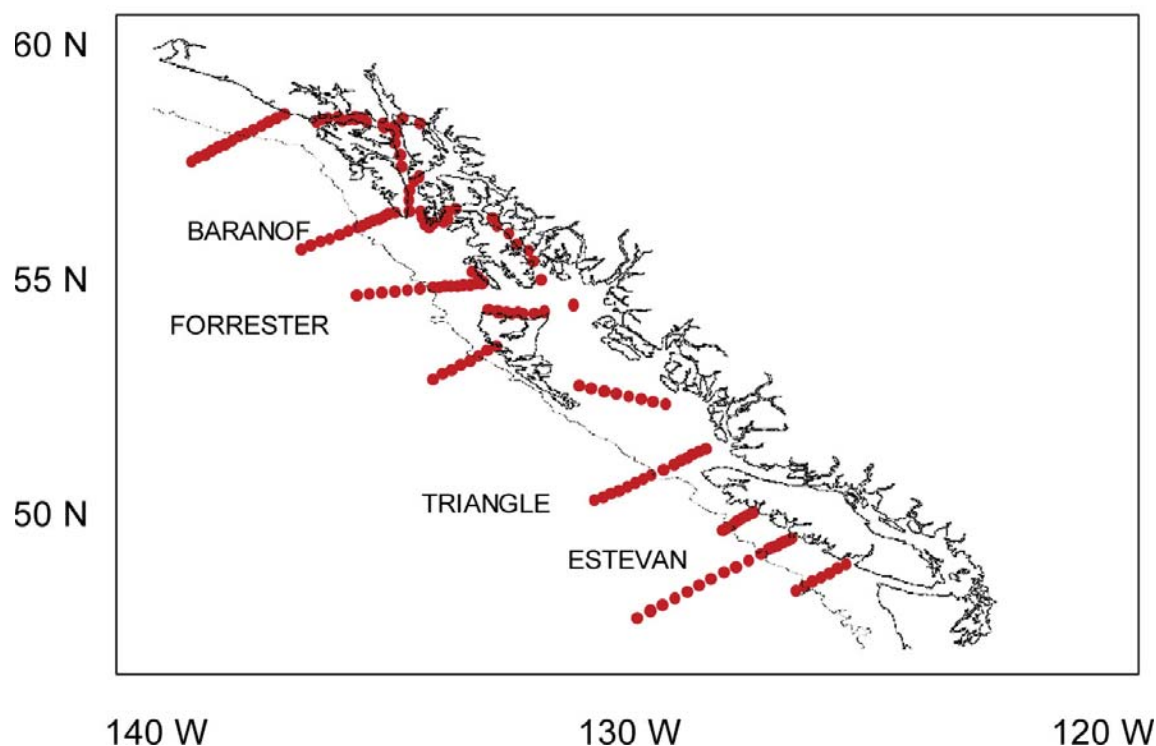
54.177	131.786	DE - McINTYRE BAY
54.164	131.985	DE - McINTYRE BAY
54.175	132.584	DE - KLASHWUN PT
54.154	132.357	DE - WIAH PT
54.154	132.137	DE - 5 NM NE WIAH PT
52.205	129.176	HECATE ST
52.260	129.437	HECATE ST
52.316	129.698	HECATE ST
52.371	129.959	HECATE ST
52.427	130.220	HECATE ST
52.482	130.481	HECATE ST
52.537	130.742	HECATE ST
52.593	131.003	HECATE ST
51.275	128.333	OFF TRIANGLE IS, WCVI
51.208	128.467	OFF TRIANGLE IS, WCVI
51.142	128.600	OFF TRIANGLE IS, WCVI
51.075	128.733	OFF TRIANGLE IS, WCVI
51.000	128.868	OFF TRIANGLE IS, WCVI
50.933	129.000	OFF TRIANGLE IS, WCVI
50.820	129.217	OFF TRIANGLE IS, WCVI
50.701	129.484	OFF TRIANGLE IS, WCVI
50.621	129.653	OFF TRIANGLE IS, WCVI
50.541	129.822	OFF TRIANGLE IS, WCVI
50.461	129.991	OFF TRIANGLE IS, WCVI
50.381	130.161	OFF TRIANGLE IS, WCVI
50.309	130.333	OFF TRIANGLE IS, WCVI
50.238	130.506	OFF TRIANGLE IS, WCVI
50.166	130.679	OFF TRIANGLE IS, WCVI
49.925	127.312	OFF KYUQUOT SD, WCVI
49.899	127.363	OFF KYUQUOT SD, WCVI
49.842	127.462	OFF KYUQUOT SD, WCVI
49.782	127.560	OFF KYUQUOT SD, WCVI
49.721	127.659	OFF KYUQUOT SD, WCVI
49.657	127.763	OFF KYUQUOT SD, WCVI
49.595	127.867	OFF KYUQUOT SD, WCVI
49.525	127.974	OFF KYUQUOT SD, WCVI
49.352	126.527	OFF ESTEVAN PT, WCVI
49.316	126.603	OFF ESTEVAN PT, WCVI
49.279	126.679	OFF ESTEVAN PT, WCVI
49.243	126.755	OFF ESTEVAN PT, WCVI
49.206	126.831	OFF ESTEVAN PT, WCVI
49.170	126.907	OFF ESTEVAN PT, WCVI
49.134	126.983	OFF ESTEVAN PT, WCVI
49.034	127.167	OFF ESTEVAN PT, WCVI
48.898	127.427	OFF ESTEVAN PT, WCVI
48.762	127.687	OFF ESTEVAN PT, WCVI
48.626	127.947	OFF ESTEVAN PT, WCVI
48.490	128.207	OFF ESTEVAN PT, WCVI
48.354	128.467	OFF ESTEVAN PT, WCVI

48.218	128.727	OFF ESTEVAN PT, WCVI
48.082	128.987	OFF ESTEVAN PT, WCVI
47.946	129.247	OFF ESTEVAN PT, WCVI
47.810	129.507	OFF ESTEVAN PT, WCVI
47.674	129.767	OFF ESTEVAN PT, WCVI

INSIDE WCVI, CANADA

49.892	126.804	ESPERANZA INLET, I_WCVI
49.873	126.919	ESPERANZA INLET, I_WCVI
49.775	127.132	ESPERANZA INLET, I_WCVI
48.914	125.205	IMPERIAL EAGLE CH
49.941	127.301	KYUQUOT CH, I_WCVI
49.976	127.256	KYUQUOT CH, I_WCVI
50.005	127.186	KYUQUOT CH, I_WCVI
50.067	127.254	KYUQUOT CH, I_WCVI
50.083	127.171	KYUQUOT CH, I_WCVI
49.914	127.561	KYUQUOT CH, I_WCVI
49.924	127.424	KYUQUOT CH, I_WCVI
50.514	127.69	QUATSINO SD, I_WCVI
50.501	127.742	QUATSINO SD, I_WCVI
50.478	127.809	QUATSINO SD, I_WCVI
50.471	127.902	QUATSINO SD, I_WCVI
48.847	125.149	TREVOR CH, I_WCVI
48.92	125.049	TREVOR CH, I_WCVI

**Map:**



### High resolution mapping of intertidal and shallow subtidal shores in Kachemak Bay, Alaska

**Related Park:** Southwest Alaska Network  
**Project Affiliations:** Alaska Department of Fish and Game, Kachemak Bay Research Reserve; Gulf Ecosystem Monitoring  
**Website Address:** <http://www.oilspill.state.ak.us/>, and <http://www.kbayrr.org/>

**Primary Contact:**

Carl Schoch, Research Coordinator  
Alaska Department of Fish and Game, Kachemak Bay  
Research Reserve  
2181 Kachemak Drive  
Homer, AK 99603 United States  
Voice: none given fax: none given

**Principal Investigators:**

**Hypotheses:**

Monitoring biological communities for a response to natural or anthropogenic perturbations must acknowledge the inherent problem of large temporal and spatial variability of natural systems. Evidence suggests that highly stratified sampling designs with multiple replicates can lower the variability of abundance estimates for benthic populations. But an objective means of identifying sample sites based on physical forcing functions is generally not available for intertidal and subtidal shores. A method was developed to partition complex shorelines into physically homogeneous segments and to quantify the physical features known to influence benthic community structure. The 543 km shoreline of Kachemak Bay, Alaska was partitioned into over 3,000 alongshore segments and the physical features of each segment were quantified. Data from nearshore moored instruments and CTD transects were used to identify oceanic gradients. These data were assembled into a GIS spatial model to provide a powerful tool for identifying replicate benthic habitats. Replicate segments were randomly selected and sampled. Population abundance estimates from biological transects were extrapolated from small to larger spatial scales within the spatial limits imposed by oceanic scale variability. This method is a first step in studying the physical mechanisms causing a response in estuarine and marine biodiversity and benthic community structure.

**Data Being Collected:**

Data being collected in 2003: Primary, secondary, and interstitial substrate size, substrate roundness, wave energy, aspect, rock type, debris volume, slope angle, dynamism, roughness, human use, dominant invertebrates and algae. ArcView shape files will be developed to depict the high tide and low tide shorelines, alongshore segments, and across-shore zones, orthophoto quadrangles, and segment attributes. Segment attributes will also be available in an MS Access database.

**Progress:** In work  
**First Year Collected:**  
**Duration of Project:** 2004  
**Duration Descript:** Completion in 2004

**West:** -152  
**East:** -150.75  
**North:** 59.9  
**South:** 59.3

**Theme Keywords:**

habitat mapping

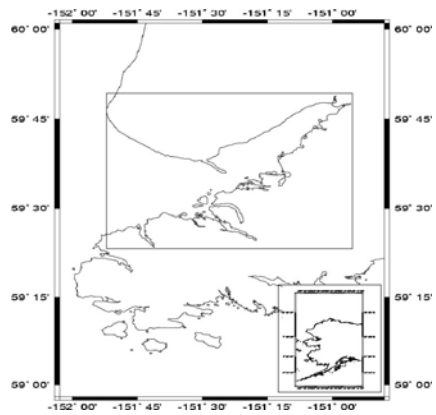
**Place Keywords:**

Kachemak Bay

**Publications:**

Annual project reports are available by contacting the Exxon Valdez Trustee Council office (see above).

**Map:**



**Modeling intertidal habitats: Producing a biological inventory for coastal management, resource assessment, and monitoring**

**Related Park:** Southwest Alaska Network  
**Project Affiliations:** Alaska Department of Fish and Game, Kachemak Bay Research Reserve; National Oceanic and Atmospheric Administration  
**Website Address:** N/A

**Primary Contact:**

Carl Schoch, Research Coordinator  
Alaska Department of Fish and Game, Kachemak Bay  
Research Reserve  
2181 Kachemak Drive  
Homer, AK 99603 United States  
Voice: none given fax: none given

**Principal Investigators:**

**Hypotheses:**

Detailed maps will be developed of the biological resources and habitat alterations in the KBRR/Kachemak Bay & Fox River. This will include over 540 km of shoreline. The increasing number of stresses on estuarine and marine ecosystems has challenged scientists and managers to find a method for determining rates and spatial extents of ecological effects related to changes in environmental conditions. One significant problem that masks these changes is the large natural fluctuation of biological populations in space and time. Furthermore, no method exists to extrapolate data collected from local monitoring sites to large areas. A method developed in Alaska (Cook Inlet and Shelikof Strait), partitions complex shorelines into physically homogeneous segments to minimize the variability of the biological community caused by physical forces. Groups of similar segments can then be aggregated to extrapolate biological transect data collected from small areas to larger spatial scales. This method is proposed for implementation in Kachemak Bay as a first step in monitoring biodiversity of this estuarine system.

**Data Being Collected:**

The Reserve will collect detailed information on (a) surface and subsurface plants and animals of the intertidal zone and (b) structures and other habitat alterations of the intertidal zone. All spatial and attribute data will be compiled in a Geographic Information System (GIS). The Reserve will produce a digital computer disk (CD) with all spatial and attribute data, presented in a user friendly, ArcView format with metadata files.

**Progress:** In work

**First Year Collected:**

**Duration of Project:** 2004

**Duration Descript:** Completion in 2004

**West:** -152

**East:** -150.75

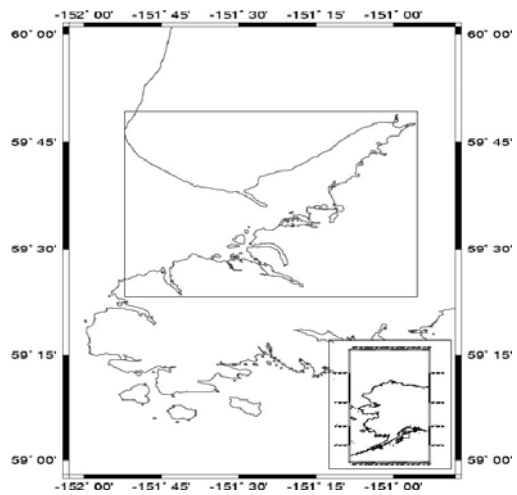
**North:** 59.9

**South:** 59.3

**Publications:**

A report and all metadata will be available upon completion of this project.

**Map:**



## Shore-zone mapping in the Gulf of Alaska

**Related Park:** Southwest Alaska Network  
**Project Affiliations:** Exxon Valdez Oil Spill Trustee Council; US Fish and Wildlife Service; US National Park Service; Cook Inlet Regional Citizens Advisory Council  
**Website Address:** <http://www.coastalandoceans.com>  
Gulf of Alaska Coastal Imagery Web Site: <http://imf.geocortex.net/mapping/cori/launch.html>

**Primary Contact:**

John Harper  
Coastal and Ocean Resources, Inc.  
214 – 9865 W. Saanich Rd  
Sidney, BC V8L 5Y8 Canada  
Voice: (250)655-4035 fax: (250)655-1290  
[John@coastalandoceans.com](mailto:John@coastalandoceans.com)

**Principal Investigators:**

**Hypotheses:**

Objective is to inventory the coastline following the Alaska ShoreZone Mapping Protocol, presently under development with EVOS.

**Data Being Collected:**

Katmai National Park Shoreline, Aniakchak National Park Shoreline, Upper Cook Inlet (E. Foreland to W. Foreland)

**Progress:** Complete  
**First Year Collected:** 2003  
**Duration of Project:** 2003  
**Duration Descript:** 1 year

**West:** -165  
**East:** -150  
**North:** 61.5  
**South:** 56

**Publications:**

Coastal and Ocean Resources Inc. 2003. ShoreZone Mapping of the Outer Kenai Peninsula Coastline. Contract Report by Coastal and Ocean Resources Inc., Sidney, BC submitted to the Exxon Valdez Oil Spill Trustee Council, Anchorage Alaska.

## A High Frequency Radar System for Real-time Surface Current Mapping in the Northern Gulf of Alaska

**Related Park:** Southwest Alaska Network  
**Project Affiliations:** National Oceanic and Atmospheric Administration  
**Website Address:** <http://www.salmonproject.org>

### Primary Contact:

Dave Musgrave  
 University of Alaska Fairbanks, School of Fisheries and Ocean  
 Science, Institute of Marine Science  
 No address  
 Voice: none given fax: none given  
[musgrave@ims.uaf.edu](mailto:musgrave@ims.uaf.edu)

### Principal Investigators:

### Hypotheses:

The surface circulation of the Northern Gulf of Alaska is forced by the winds and the buoyant (low-density) influx of freshwater from rivers. The wind response is reasonably well understood. It consists of a surface current flowing downwind with having broad spatial scales (often >100 km) and temporal scales similar to the wind field. Winds over the Gulf of Alaska are primarily alongshore (east-west) with the surface currents generally fluctuating in the alongshore direction. However the introduction of vertical and horizontal density gradients through buoyancy forcing can significantly complicate the wind-forced circulation response. Planktonic species present in waters influenced by buoyancy inputs might follow trajectories considerably different from those forced solely by winds. The difference arises because strong horizontal density gradients (fronts) generated by the buoyant influx will generate alongfront currents that could impede or enhance the wind-induced flow. Often these fronts are narrow (~10 km or less) and include regions of high current shear). The fronts can also become unstable forming energetic current meanders and detached eddies that might propagate away from their region of formation. These processes can disperse plankton both along and across the shelf often in unpredictable ways. The conditions under which these motions are spawned are poorly understood in even simple settings such as constant winds and freshwater runoff. The situation is even more complicated in the Northern Gulf of Alaska because of the complex bathymetry and tremendous seasonal variability in river discharge, precipitation rate, and wind. Clearly these processes inhibit the predictive capability of ocean circulation models and therefore complicate resource management planning. Current measurements of these circulation phenomena from ships and/or moored instruments are difficult for several reasons. The currents are probably very shallow (~10m) making it difficult to obtain near-surface current measurements from a vessel without specially constructed instrumentation. Moreover, several vessels would need to be running continuously in order to obtain synoptic coverage of the current field. In principle, moored instrumentation could obtain the necessary measurements; however, an impractically large numbers of such instruments would have to be deployed to achieve this goal. Satellite measurements can be of value in estimating spatial scales of variability but provide no information on current magnitude. Moreover, the frequently heavy cloud cover in this region results in relatively few useful images throughout the year.

High frequency radar technology offers the potential for efficiently mapping surface currents in a synoptic manner. These land-based radars (CODAR) can generate synoptic surface current maps with a spatial resolution of ~5 km over a broad horizontal domain. These measurements can be made at a rapid rate (half-hourly or longer sampling intervals) and be transmitted in near realtime via the Internet. The system consists of two or more antenna and a data acquisition system. The CODAR is small and easily transported by a pickup truck or helicopter. CODARs are proven and operational in several coastal regions throughout the Lower 48 and there are plans at IMS to deploy several of these in the Gulf of Alaska. Our proposal has two main objectives. First, we will purchase, install, and operate a CODAR system in the vicinity of Cook Inlet during the 2003 winter and spring season (~mid-December – May). Data from the CODAR will be distributed via Internet and immediately accessible to any interested parties (state and federal agencies, citizens, oil industry, etc.). Tentatively we plan to deploy the CODAR at locations in Kenai and Kasilof, Alaska. These sites are attractive primarily because the logistics are straightforward. Both sites are accessible by vehicle and both have sufficient power to operate the CODAR. The proposed CODAR system will map the surface circulation over a 70 km x 70 km area with a resolution of 1 km. Data communications between the field and the Fairbanks central node will be established through the STARBAND satellite communication system. We will use the Cook Inlet setting to develop and evaluate an autonomous power system (battery powered and re-charged by wind and solar power with a propane-fueled backup generator). At the conclusion of this phase we will have a fully autonomous CODAR system that could be deployed at remote sites along the Gulf of Alaska. The second goal of the proposal is to deploy the autonomously powered CODAR system at remote sites along the Gulf of Alaska. To achieve this we propose to re-deploy the CODAR system to the Gulf of Alaska after the field effort in Cook Inlet ends (September 2003). We will propose to NOAA in fall 2003 to continue the mapping of surface currents in the nearshore Gulf of Alaska during the 2004 seasons and beyond.



**Data Being Collected:**

Data being collected in 2003: Surface Current Velocities in Cook Inlet and the nearshore Gulf of Alaska between Prince William Sound and Kennedy Entrance

**Progress:**

**First Year Collected:** 2002

**Duration of Project:** 2004

**Duration Descript:** December 2002 and March 2004

**West:** -153

**East:** -145

**North:** 61.5

**South:** 58

**ARGO (A Global Array of Profiling Floats) and Line P surveys 2. Line P Time-Series Program**

**Related Park:** Alaska Region  
**Project Affiliations:** Fisheries and Oceans Canada/Institute of Ocean Sciences  
**Website Address:** [http://www.sci.pac.dfo-mpo.gc.ca/osap/data/linep/linepselectdata\\_e.htm](http://www.sci.pac.dfo-mpo.gc.ca/osap/data/linep/linepselectdata_e.htm)

**Primary Contact:**

Robert Marie  
Fisheries and Oceans Canada/Institute of Ocean Sciences  
No address  
Voice: none given fax: none given  
[robertm@pac.dfo-mpo.gc.ca](mailto:robertm@pac.dfo-mpo.gc.ca)

**Principal Investigators:**

Frank Whitney  
Fisheries and Oceans Canada/Institute of Ocean Sciences  
No address  
Voice: none given fax: none given  
[whitneyf@pac.dfo-mpo.gc.ca](mailto:whitneyf@pac.dfo-mpo.gc.ca)

Howard Freeland  
Fisheries and Oceans Canada/Institute of Ocean Sciences  
No address  
Voice: none given fax: none given  
[freelandhj@pac.dfo-mpo.gc.ca](mailto:freelandhj@pac.dfo-mpo.gc.ca)

**Hypotheses:**

1. ARGO intends to populate the world ocean with 3000 drifters which will profile from 2000 m to surface every 10 days. Data is quickly available on the web e.g. [www.argo.jcommops.org/](http://www.argo.jcommops.org/) Through IOS efforts; the Gulf of Alaska is well populated with floats at present.
2. Line P surveys are carried out in winter; spring and late summer each year to monitor ocean change. Data has been collected since 1956 which makes the data set invaluable in assessing the affects of climate variability and change on the Gulf of Alaska.

**Data Being Collected:**

Data being collected in 2003: Line P surveys in Feb, Jun and September. ARGO T and S profiles every 10 days.

**Progress:** In work  
**First Year Collected:**  
**Duration of Project:**  
**Duration Descript:** Many years

**West:** -164.5  
**East:** -125  
**North:** 61.5  
**South:** 48

**Publications:**

Many. Contact PI's

**Maps:** Available on web sites above.

### Cook Inlet Current Survey

**Related Park:** Southwest Alaska Network  
**Project Affiliations:** NOAA National Ocean Service/ Center for Operational Oceanographic Products and Services  
**Website Address:** <http://www.co-ops.nos.noaa.gov>

#### Primary Contact:

Karen Grissom  
NOAA National Ocean Service/ Center for Operational  
Oceanographic Products and Services  
1305 East West Highway  
Silver Spring, MD 20910 United States  
Voice: (757)436-0200 fax: none given  
Karen.grissom@noaa.gov

#### Principal Investigators:

Peter Stone  
NOAA National Ocean Service/ Center for Operational  
Oceanographic Products and Services  
1305 East West Highway  
Silver Spring, MD 20910 United States  
Voice: (301)713-2890 x149 fax: none given

#### Hypotheses:

To collect data and information on surface currents in Southern Cook Inlet for tidal analysis, and to help determine future locations of sub-surface Acoustic Doppler Current Profiler installations. The information will be used to verify and update existing tidal current predictions and produce predictions at new locations, all to affect the safe and efficient marine transportation within Cook Inlet.

#### Data Being Collected:

Data being collected in 2003: Summer months of 2003

**Progress:** Complete

**First Year Collected:** 2003

**Duration of Project:** 2003

**Duration Descript:** 3 months

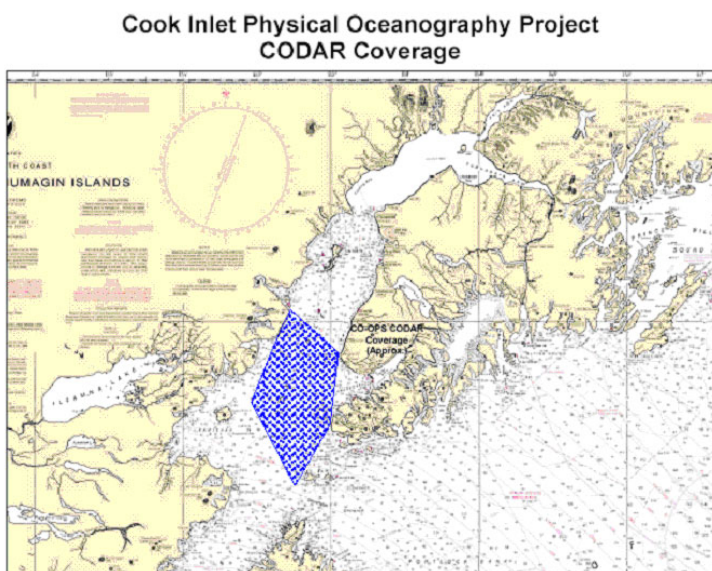
**West:** -153.5

**East:** -149.5

**North:** 60.5

**South:** 58.5

#### Map:



## Near Real-Time Biophysical Moorings for the Monitoring of Chiswell Ridge

**Related Park:** Kenai Fjords National Park  
**Project Affiliations:** Alaska Sea Life Center; National Marine Fisheries Service  
**Website Address:** <http://www.salmonproject.org>

### Primary Contact:

Dave Musgrave  
 University of Alaska Fairbanks, School of Fisheries and Ocean  
 Science, Institute of Marine Science  
 No address  
 Voice: none given fax: none given  
[musgrave@ims.uaf.edu](mailto:musgrave@ims.uaf.edu)

### Principal Investigators:

### Hypotheses:

The goal of this project is to develop and demonstrate a low-cost system for retrieving biological and physical oceanographic data from instruments in the coastal ocean and delivering these data in near real-time. This work is conducted in co-operation with the Alaska SeaLife Center for the purposes of monitoring the state of the ecosystem within the near-shore foraging zone of Stellar Sea Lions located at the Chiswell Island rookery.

### Data Being Collected:

Data being collected in 2003:  
 - Water column currents  
 - Temperature  
 - Salinity  
 - Fluorescence  
 - Transmissivity  
 - Photosynthetically available radiation

**Progress:** In work

**First Year Collected:** 2003

**Duration of Project:** 2004

**Duration Descript:** Summer 2003 through Summer 2004

**West:** -150.5

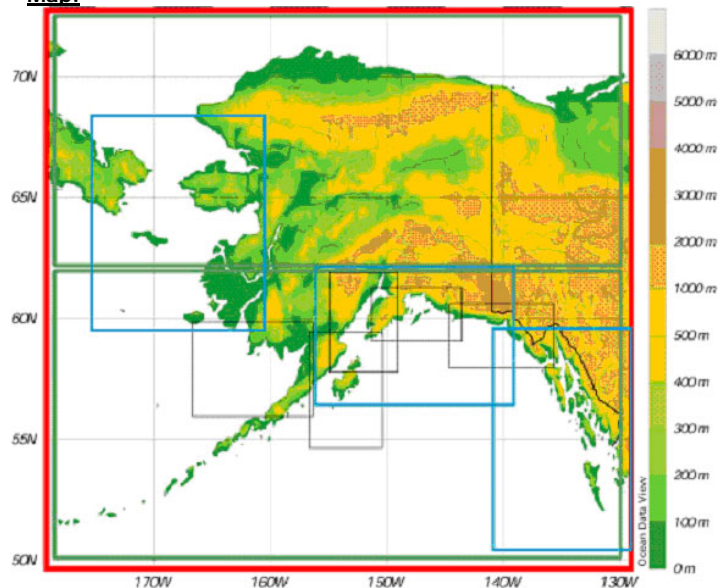
**East:** -148

**North:** 60.2

**South:** 59

**Map Description:** Location of the Chiswell Ridge near real-time buoy

### Map:



**NOAA/Pacific Marine Environmental Laboratory Ocean Climate Research Profiling Floats**

**Related Park:** Alaska Region  
**Project Affiliations:** NOAA, Steller's Sea Lion Research  
**Website Address:** <http://floats.pmel.noaa.gov/floats/>

**Primary Contact:**

Gregory C. Johnson  
NOAA, Pacific Marine Environmental Laboratory  
7600 Sand Point Way, NE  
Seattle, WA 98115 United States  
Voice: none given fax: none given

**Principal Investigators:**

**Hypotheses:**

To describe the large-scale oceanographic conditions in the Southeast Bering Sea and south of the Aleutian Islands from seasonal to decadal time-scales.

**Data Being Collected:**

Profiling CTD float data

**Progress:** In work

**First Year Collected:**

**Duration of Project:**

**Duration Descript:** Until floats cease reporting, which could be through 2007.

**West:** -180

**East:** -155

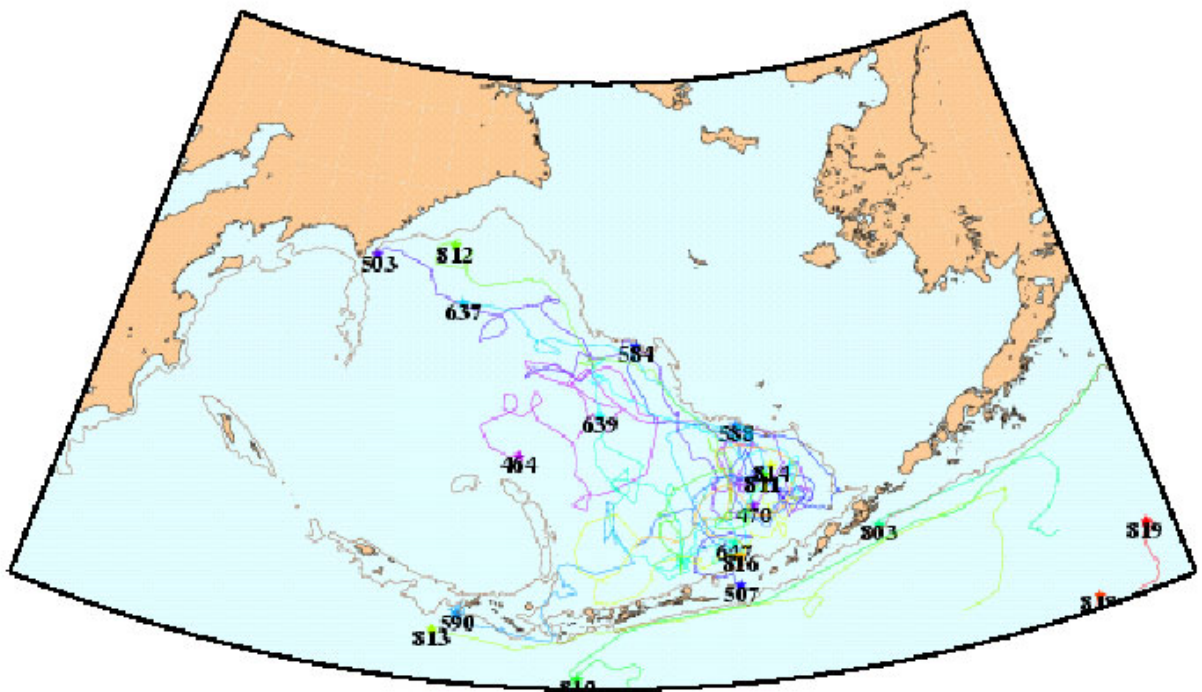
**North:** 65

**South:** 45

**Publications:**

Johnson, G. C., P. J. Stabenro, and S. D. Riser. 2003. The Bering Slope Current System revisited. Journal of Physical Oceanography, revised.

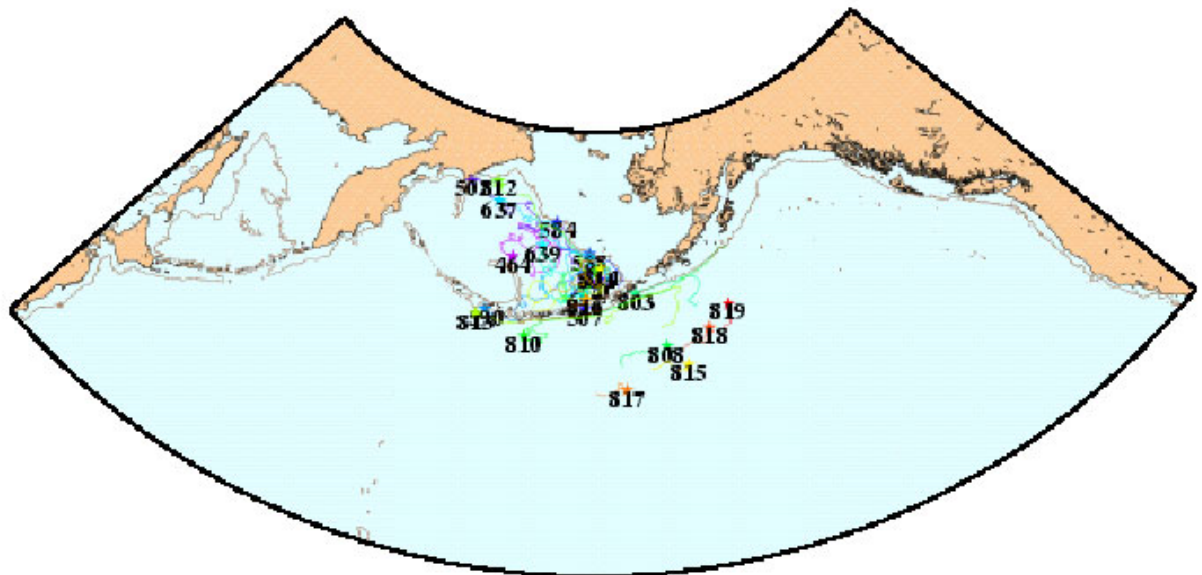
**Map:**



102501J19004 36397.32

★ : Most recent known location of float.

*As of 20 Jun 2003*



102501J19052 36397.32

★ : Most recent known location of float.

*As of 20 Jun 2003*

# NOAA/Pacific Marine Environmental Laboratory Ocean Climate Research Profiling Floats

**Related Park:** Alaska Region  
**Project Affiliations:** NOAA, Steller's Sea Lion Research  
**Website Address:** <http://floats.pmel.noaa.gov/floats/>

**Primary Contact:**

Gregory C. Johnson  
 NOAA, Pacific Marine Environmental Laboratory  
 7600 Sand Point Way, NE  
 Seattle, WA 98115 United States  
 Voice: none given fax: none given

**Principal Investigators:**

**Hypotheses:**

To describe the large-scale oceanographic conditions in the Southeast Bering Sea and south of the Aleutian Islands from seasonal to decadal time-scales.

**Data Being Collected:**

Year 2003 - Profiling CTD float data

**Progress:** In work

**First Year Collected:**

**Duration of Project:** 2007

**Duration Descript:**

**West:** 171

**East:** -156

**North:** 67

**South:** 51

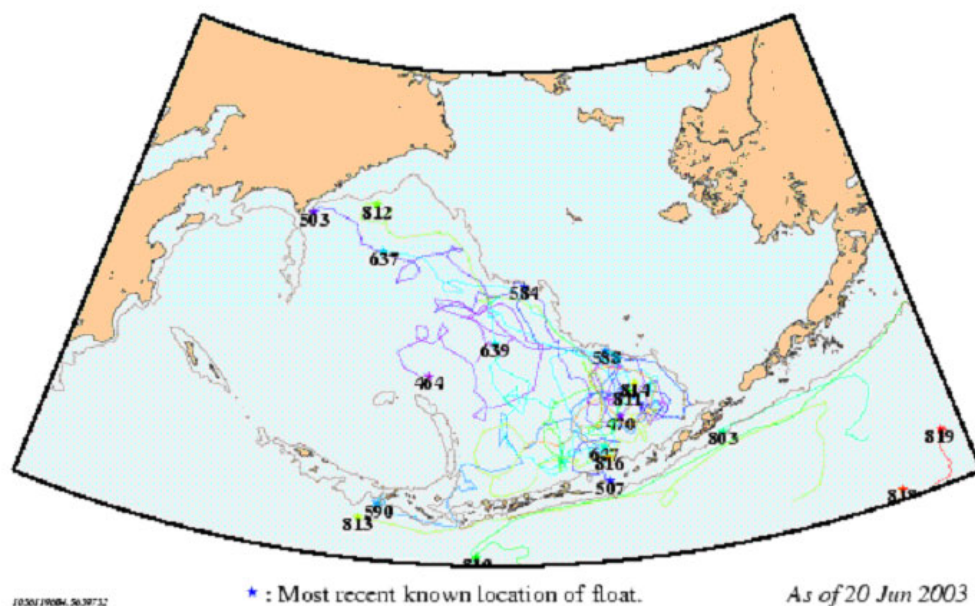
**Publications:**

Johnson, G. C., P. J. Stabenro, and S. D. Riser. 2003. The Bering Slope Current System revisited. Journal of Physical Oceanography, revised.

**Comments:**

Expected duration: Until floats cease reporting, which could be through 2007

**Map:**



**Nowcast/Forecast System for Prince William Sound: Observational Oceanography**

**Related Park:** Alaska Region  
**Project Affiliations:** Prince William Sound Science Center  
**Website Address:** <http://www.pwssc.gen.ak.us>

**Primary Contact:**

Shari Vaughan  
Prince William Sound Science Center  
P. O. Box 705  
Cordova, AK 99574 United States  
Voice: (907)424-5800 fax: none given  
[vaughan@pwssc.gen.ak.us](mailto:vaughan@pwssc.gen.ak.us)

**Principal Investigators:**

**Hypotheses:**

To collect current and T/S data for numerical circulation model validation

**Data Being Collected:**

Data being collected in 2003: T/S data (XCTDs) at 3 stations in central PWS and Hinchinbrook Entrance, current data (towed downward looking ADCP) in central PWS and Hinchinbrook Entrance

**Progress:** In work

**First Year Collected:** 2003

**Duration of Project:** 2006

**Duration Descript:** Approval for FY03, probably continued funding in FY04-FY06

**West:** -149

**East:** -145.5

**North:** 61.4

**South:** 59.75



### Physical forcing of marine productivity: monitoring moorings on the Gulf of Alaska shelf

**Related Park:** Alaska Region  
**Project Affiliations:** North Pacific Research Board; Alaska Sea Life Center; National Marine Fisheries Service; North Pacific Marine Research Institute  
**Website Address:** <http://www.salmonproject.org>

**Primary Contact:**

Dave Musgrave  
University of Alaska Fairbanks, School of Fisheries and Ocean  
Science, Institute of Marine Science  
No address  
Voice: none given fax: none given  
[musgrave@ims.uaf.edu](mailto:musgrave@ims.uaf.edu)

**Principal Investigators:**

**Hypotheses:**

We propose to continue two years of monitoring meteorological conditions, freshwater input, temperature, salinity, velocity, nutrient and chlorophyll levels for the purpose of establishing the mechanistic links between physical forcing and biological responses such as primary productivity. We plan to place two closely spaced moorings on the shelf of the Gulf of Alaska about 60 km offshore of Seward. One mooring will monitor temperature, salinity and horizontal velocities, and the other will monitor nitrate levels, sinking particulate matter, fluorescence and light levels. This proposed study, in conjunction with the present GLOBEC monitoring study in the Gulf of Alaska, will permit us to understand the relationship between physical forcing and higher trophic levels (marine mammals, birds, and fish). The proposed research addresses the NPRB priority to investigate "marine ecosystem structure and processes." Specifically, the factors affecting marine productivity, including nutrient transport and availability, the effects of water column stability, the influence of climate variability on chemical and biological processes, unusual occurrences of organisms and long term monitoring of phytoplankton and zooplankton in relation to biophysical parameters are the subjects of the proposed work.

**Data Being Collected:**

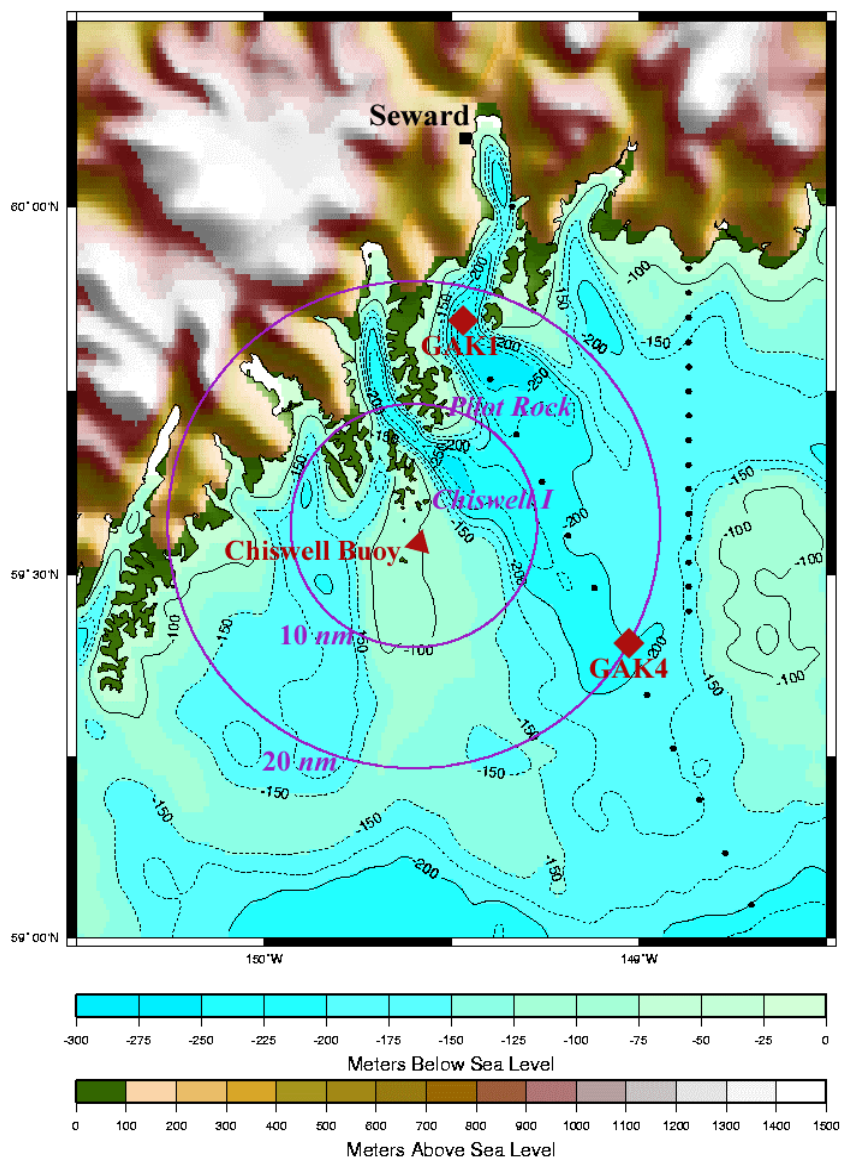
Data being collected in 2003:  
- Water column currents.  
- Temperature  
- Salinity  
- Fluorescence  
- Transmissivity  
- Photosynthetically available radiation  
- Dissolved nitrate  
- Sinking Particulate matter

**Progress:** Complete  
**First Year Collected:** 2000  
**Duration of Project:** 2003  
**Duration Descript:** August 2000 through August 2003

**West:** -150  
**East:** -148  
**North:** 60  
**South:** 59

**Map Description:** Location of the GAK4 buoy

**Map:**



### Real-Time AVHRR Imagery

**Related Park:** Alaska Region  
**Project Affiliations:** National Aeronautics and Space Administration  
**Website Address:** <http://www.salmonproject.org/avhrr>

**Primary Contact:**

Dave Musgrave  
University of Alaska Fairbanks, School of Fisheries and Ocean  
Science, Institute of Marine Science  
No address  
Voice: none given fax: none given  
[musgrave@ims.uaf.edu](mailto:musgrave@ims.uaf.edu)

**Principal Investigators:**

Rachel Potter  
University of Alaska Fairbanks, School of Fisheries and Ocean  
Science, Institute of Marine Science  
No address  
Voice: none given fax: none given  
[rpotter@ims.uaf.edu](mailto:rpotter@ims.uaf.edu)

**Hypotheses:**

This project provides real-time sea surface temperatures for the year 2003, not only the Gulf of Alaska but in coastal waters all around the state. Users can view .gif images, either in real-time or historically, from the region of their choice via the World Wide Web. The actual data for these areas is available upon request. This is a component of a project that hopes to delve into operational oceanography and is provided as a service to any interested end user.

**Data Being Collected:**

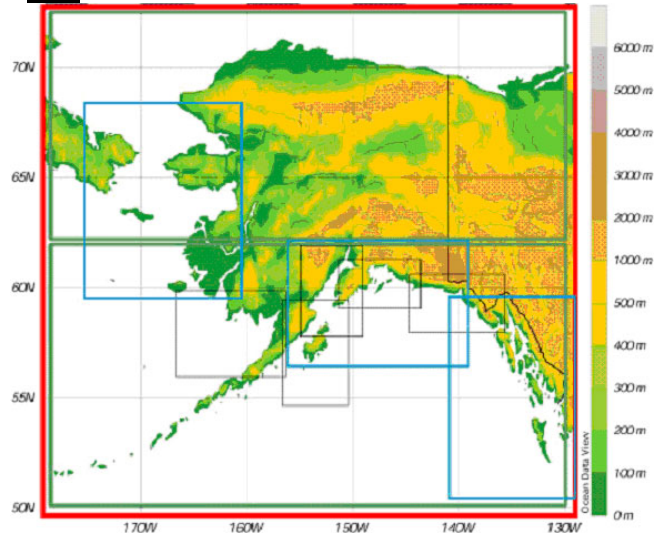
Data being collected in 2003: Hourly Regional Sea Surface Temperatures

**Progress:** In work  
**First Year Collected:** 2003  
**Duration of Project:**  
**Duration Descript:** may continue depending on interest and funding

**West:** -180  
**East:** -130  
**North:** 71.3  
**South:** 50

**Map Description:** images are available on website

**Map:**



**Simulation of the Circulation, Mixing and Lower Trophic Levels in the Gulf of Alaska****Related Park:** Alaska Region**Project Affiliations:** Global Ocean Ecosystem Dynamics; National Aeronautics and Space Administration; Arctic Regional Supercomputing Center, University of Alaska**Website Address:** <http://www.salmonproject.org>**Primary Contact:**Dave Musgrave  
University of Alaska Fairbanks, School of Fisheries and Ocean  
Science, Institute of Marine Science

No address

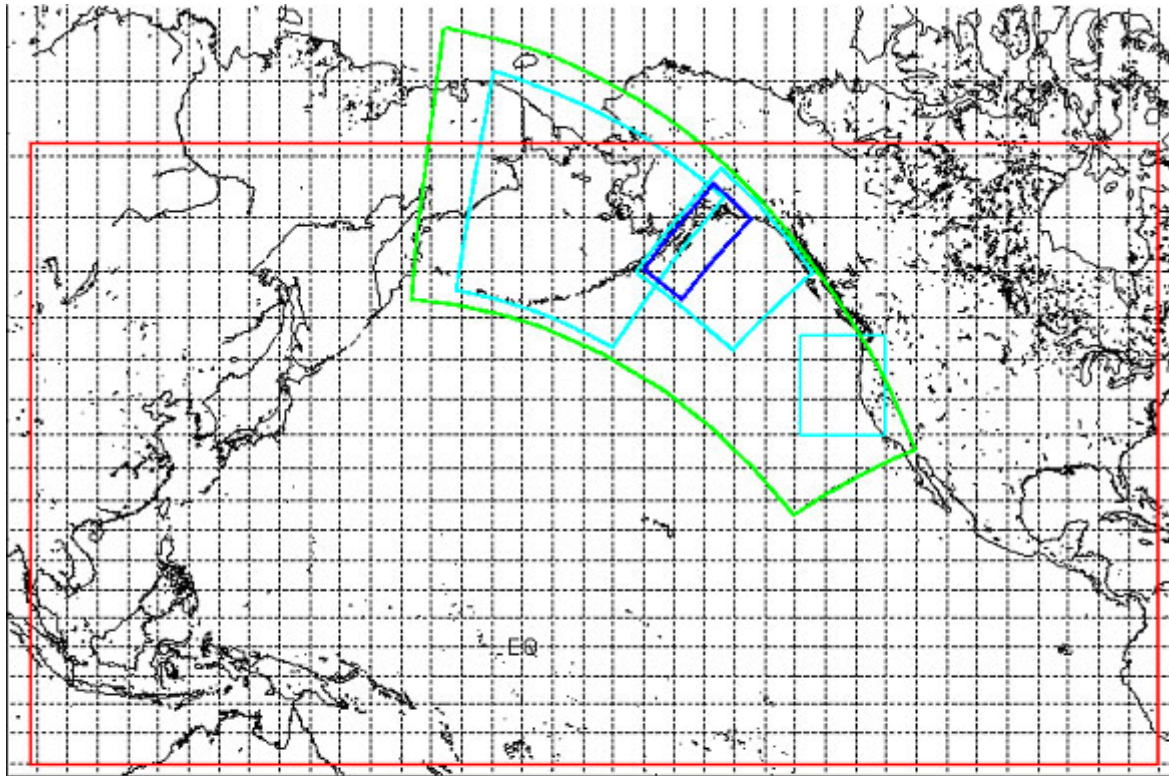
Voice: none given fax: none given  
musgrave@ims.uaf.edu**Principal Investigators:**Dale Haidvogel  
Rutgers University  
No address  
Voice: none given fax: none given  
dale@IMCS.Rutgers.EDU**Hypotheses:**

This project simulates the physics and lower trophic level interactions in the Gulf of Alaska. To achieve high resolution three grids, 3-km, 10-km and 40-km, are nested with domains that include, respectively, the Gulf of Alaska, Baja California to Kamchatka and the entire N. Pacific (20 S to the Bering Sea). We are developing a 1-km model for the Northern Gulf of Alaska. The model used is the Regional Ocean Model System developed at Rutgers University. It has 482x482 grid points horizontally and uses an S-coordinate with 30 levels in the vertical. It uses a Large-McWilliams-Doney vertical mixing scheme. Forcing includes monthly climatology for heat and momentum flux, the first 6 tidal harmonics and a line source of fresh water runoff from Royer.

A 10-12 component lower trophic level ecosystem (including nutrients, phytoplankton and zooplankton) is also being developed.

New simulations will include daily wind forcing and large river (Alsek, Copper and Sustina R) point sources of runoff.

**Data Being Collected:** N/A**Progress:** In work**First Year Collected:****Duration of Project:****Duration Descript:** Ongoing model development**West:** -162**East:** -130**North:** 60**South:** 48**Map Description:** Note: the cyan box on the west coast of the US is an ongoing project in the California Current System and the cyan box in the Bering Sea was a modeling project proposed to the NPRB.**Map:**



Delta x = 20–40 km    Delta x = 10 km    Delta x = 3 km    Delta x = 1 km

Note: the cyan box on the west coast of the US is an ongoing project in the California Current System and the cyan box in the Bering Sea was a modeling project proposed to the NPRB.

## Physical, Plankton

### GLOBEC-NEP: Topographic Control of Mesoscale Variability in the Gulf of Alaska

**Related Park:** Kenai Fjords National Park  
**Project Affiliations:** National Science Foundation  
**Website Address:** <http://www.salmonproject.org>

**Primary Contact:**

Dave Musgrave  
University of Alaska Fairbanks, School of Fisheries and Ocean  
Science, Institute of Marine Science  
No address  
Voice: none given fax: none given  
[musgrave@ims.uaf.edu](mailto:musgrave@ims.uaf.edu)

**Principal Investigators:**

Terry Whittledge  
University of Alaska Fairbanks, School of Fisheries and Ocean  
Science, Institute of Marine Science  
No address  
Voice: none given fax: none given  
[whittledge@ims.uaf.edu](mailto:whittledge@ims.uaf.edu)

**Hypotheses:**

This proposal addresses studies of the physical and biological distributions and processes and their effect on juvenile salmon recruitment on the Gulf of Alaska shelf. The spatial scope of the study is from Montague Strait to west of the Chiswell Ridge. The overriding theme of the proposal is that along-shelf and cross-shelf mesoscale structures are due to bathymetric control of the currents. Physical and biological oceanographic characteristics associated with the Alaska Coastal Current, its offshore excursions in the Seward Eddy and Seward Counter Eddy, the shelfbreak front, slope eddies and meanders and the deep flow. These features affect the transport and distribution of deep-water zooplankton that are alleged to be an important food source for juvenile salmon and may determine their survival. An undulating, underwater, towed vehicle (SeaSoar) will be used to continuously map salinity, temperature, depth (CTD), biooptical parameters, and mesozooplankton (optical plankton counter). Surface samples of the above (minus depth), nutrients, and chlorophyll fluorescence will be measured continuously using similar sensors. We will use an Acoustic Doppler Current Profiler (ADCP) to measure along- and cross-track velocities to 150 m. We will calibrate the above with on-station samples of salinity, temperature, nutrients, phytoplankton. In May and July, 2003, we will conduct two to three synoptic surveys (5 days each) of cross-shelf transects spaced every 10 km along shelf.

**Data Being Collected:**

Data being collected in 2003: Temperature, salinity, chlorophyll, absorption, attenuation, ocean color, scattering, nitrate, phosphate, silicate

**Progress:** In work  
**First Year Collected:** 2003  
**Duration of Project:** 2003  
**Duration Descript:** May and July 2003

**West:** -152  
**East:** -143.5  
**North:** 60.5  
**South:** 57.5

**Map:**

